Cognitive Software Complexity Analysis

by

Manasa Priyamvada Mannava

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Graduate Supervisory Committee:

Arbi Ghazarian, Chair
Ashraf Gaffar
Ajay Bansal

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ABSTRACT

A well-defined Software Complexity Theory which captures the Cognitive means of algorithmic information comprehension is needed in the domain of cognitive informatics & computing. The existing complexity heuristics are vague and empirical. Industrial software is a combination of algorithms implemented. However, it would be wrong to conclude that algorithmic space and time complexity is software complexity. An algorithm with multiple lines of pseudocode might sometimes be simpler to understand that the one with fewer lines. So, it is crucial to determine the Algorithmic Understandability for an algorithm, in order to better understand Software Complexity. This work deals with understanding Software Complexity from a cognitive angle. Also, it is vital to compute the effect of reducing cognitive complexity. The work aims to prove three important statements. The first being, that, while algorithmic complexity is a part of software complexity, software complexity does not solely and entirely mean algorithmic Complexity. Second, the work intends to bring to light the importance of cognitive understandability of algorithms. Third, is about the impact, reducing Cognitive Complexity, would have on Software Design and Development.

DEDICATION

This work is dedicated to my parents.

ACKNOWLEDGMENTS

I thank my supervisor, Dr. Arbi Ghazarian, for his guidance. He has been a great source of help throughout. Thanks to my classmates for doing my experiment. I also thank my Committee, Dr. Ashraf Gaffar and Dr. Ajay Bansal for their support.

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PREFACE

Welcome to the world of Software Complexity. If Software Complexity is what interests you, then you should not miss out on this. Here is a novel approach towards Software Complexity Analysis. While there are different dimensions to modern day Software Complexity like Algorithmic space & time complexity, requirements based Software Complexity, Halstead's theory, McCabe's Cyclomatic Complexity, Henry and Kafura's fan-in/ fan-out theory, this work is unique in its own way. It stresses the need for a Cognitive Software Complexity theory and the impact reducing Cognitive Complexity would have, in software product development.

Modern day software is a collection of algorithms implemented in a programming language. Not understanding the algorithm/s makes it a nightmare for software developers and Cognitive complexity results exactly out of this! It is the complexity that results out of low understandability of software being developed. It is therefore crucial to reduce this cognitive complexity for the Software developers, to ensure better product development from their end. Thus Cognitive Software Complexity, is an important aspect to be considered in developing intuitive and better software.

Extensive research has been done and Cognitive complexity has been analyzed with an experiment performed by 28 subjects. Observations have been noted and results have been generated. The results have been discussed in detail and the later chapters provide a through and complete analysis about Cognitive Software Complexity. Conclusion and future scope of the work has also been discussed.

BACKGROUND LITERATURE

The IEEE Standard Computer Dictionary defines 'complexity' as "the degree to which a system or component has a design or implementation that is difficult to understand and verify" [IEEE 1990]. The phrase "difficult to understand" is relative. Meaning, what is difficult to comprehend for an observer need not necessarily be the same for the other.

The other definition of software complexity deals with psychological complexity (also known as cognitive complexity) of programs explaining that "true meaning of software complexity is the difficulty to maintain, change and understand software" [2]

Till date, Software Complexity has been viewed from various angles. According to the developer, it is the measure of the difficulty faced while implementing the functional requirements of the system within the cost and schedule.

From the tester's perspective, it is the effort needed to test whether the software developed, is defect free. According to the maintenance programmer, it is the effort needed to understand the original developer's work to modify software after launch.

Over time, a lot of thought has been put to devise means to reduce this complexity. For this, it is important to first identify and then reduce the incidental complexity of the system. One of the best ways to limit the software complexity is to have a thorough rationale with each requirement. This includes drawing a clean distinction between the "necessary" and the "nice-to-haves". It is important to do so, as this process stabilizes the requirements of the software and reduces confusion. Having shifting requirements introduces additional costs adding to the complexity.

Most of the Softwares contain complexity in terms of what is called the essential and accidental complexity. While measuring complexity, it is important to measure both these essential and accidental complexities. While essential complexity is inherent

and unavoidable, accidental complexity is caused by the approach chosen to solve the problem.

Accidental complexity is complexity that arises in computer programs or their development process (computer programming) which is non-essential to the problem being solved. Essential complexity arises from what the system should do and accidental complexity is a result of how the system is built. [3]

Essential functionality is the requirements of the system being built which cannot be removed. On the other hand, Incidental/Accidental complexity is the complexity that results due to the choices made while building the software product such as software architecture, design of data structures, programming language used, and coding guidelines followed. The Incidental/Accidental Software complexity can be reduced to a great extent with wise choices. Best software development practices have minimal accidental complexity.

Software complexity should be viewed not only in terms of essential functionality Vs incidental complexity but various other factors like, interdependent variables, tight coupling & complex interactions and discrete states Vs Continuous functions.

Dietrich Dörner, a cognitive psychologist, defined Complexity as, "Complexity is the label we give to the existence of many interdependent variables in a given system. The more variables and the greater their interdependence, the greater that system's complexity.

Great complexity places high demands on a planner's capacities to gather information, integrate findings, and design effective actions. The links between the variables oblige us to attend to a great many features simultaneously, and that, concomitantly, makes it impossible for us to undertake only one action in a complex system. … A system of variables is 'interrelated' if an action that affects or is meant to affect one part of the system will also affect other parts of it. Interrelatedness

guarantees that an action aimed at one variable will have side effects and long-term repercussions."[Dörner 1996]. So, higher the inter-relatedness, higher will be the complexity.

Viewing software in terms of modules, it is important to take into account both the intra-modular and inter-modular complexity and the degree of coupling that exists within these modules. For Example, when making changes to the software, there is a risk of these modules, unintentionally interfering with each other's functionalities. This increases the chance of introducing defects which are not good for the software system. It is crucial to measure and control software complexity both at the, inter and intra modular level for the reason that it has a direct impact on the maintenance and extensibility of the software system.

The intra-modular complexity deals with the complexity due to the interactions that exists within a module. The inter-modular complexity emanates from the interactions between different modules. Loose coupling ensures that the effects of these interactions and changes made during the development process do not introduce defects. More the defects, more the time required to correct those defects. More the time, more the effort needed to rectify those defects, making it complex. Thus loose coupling and tight cohesion reduce software complexity.

In order to better explain software complexity, researchers have come up with different software complexity metrics. The cognitive complexity theory proposed by Wang and Shao, is based on providing cognitive weights to the basic control structures. They defined that, the cognitive weight of software is the degree of difficulty or relative time and effort required for comprehending a given piece of software modeled by a number of BCSs. [4].

According to Wang and Shao, the cognitive functional size of a basic software component that only consists of one method, Sf, is defined as a product of the sum

of inputs and outputs (Ni/o) and the total cognitive weight. Their theory declared that,

(a) the CFS of software in design and comprehension is dependent on three factors: internal processing structures, as well as the number of inputs and outputs.

(b) The cognitive complexity measure (CFS) is more robust than the physical-size measure and independent of language/implementation.

(c) CFS provides a foundation for cross-platform analysis of complexity and size of both software specifications and implementations for either design or comprehension purposes in software engineering. [4]

However, the main issue with this method is that it neglects the amount of information contained in the system.

Another measure for software complexity is the cognitive information complexity measure. This theory is based on the information contained in the software system. It is found that software with higher cognitive information complexity measure has more information units contained in it.

It is given by the formula,

CICM = WICS * SBCS [9]

The information contained in the software is given by:

Ei = ICS/ LOCS where, Ei represents Information Coding Efficiency. [9]

Therefore cognitive information complexity measure can be used to understand the cognitive information complexity and the information coding efficiency of the software. [5].This theory is based on the weighted information count and the sum of the cognitive weights of basic control structures of the software. The drawback with this method is that the requirements based complexity of the software is neglected.

Various other software complexity metrics to measure the complexity of object oriented systems include Bowles metrics, Troy and Zweben metrics and Ligier metrics. While Bowles metrics measures the module and system complexity, the coupling that exists between the parameters and global variables that exist within programs.

Troy and Zweben metrics measures the complexity of the modules that exists within the system and the coupling that exists between these modules. It also considers the complexity of the structures and methods present in the system and the calls made to and from them.

Another popular complexity measure is the Requirements based Software Complexity Measure. It is defined from the attributes derived from the Software Requirements Specification document. This theory discusses various attributes that contribute to software complexity, like the Input Output Complexity, Functional Requirements Complexity, Non-Functional Requirements Complexity, Requirements Complexity, Product Complexity (PC), Personal Complexity (PCA), Design Constraints Imposed (DCI), Interface Complexity (IFC), User/Location Complexity (ULC), System Feature Complexity (SFC).

The Input Output Complexity is primarily based on the inputs and outputs of the software system and is given by the formula,

IOC = No. of Inputs + No. of Outputs + No. of Interfaces + No. of files [10]

The Functional Requirements Complexity is the complexity of the fundamental actions that must take place in the software in accepting and processing the inputs and in processing and generating outputs.

It is given by the formula,

FR = No: of Functions * $\sum_{i=1}^{n} SPF_i$

, where SPF represents the sub-functions [10]

The Non-Functional Requirements Complexity represents the complexity involved while dealing with quality related requirements and is given by the formula,

NFR = $\sum_{i=1}^{3}\sum_{j=1}^{3}$(Type i * Count j) [10]

where Type could be a must be/optional/important requirement and count would be the number of such requirements.

The Requirements Complexity is the combination of all the functional and non-functional requirements of the software system.

It is mathematically given by the formula,

RC = FR * NFR [10]

Product Complexity is the overall complexity of the product being developed. And

PC = IOC * RC [10]

Interface Complexity is the complexity involved by having a number of different external interfaces.

IFC = {0, if no external interface

Value, if external interface exists

Users/Location Complexity is the complexity that takes into account the number of users and locations the software has to be deployed.

ULC = No: of User * No: of Location [10]

System Feature Complexity refers to the complexity related to the features of the system that enhance the look and feel of the system and is given by

SFC = (Feature1 * Feature 2 *…* Feature n) [10]

On the whole, the requirement based Complexity measure is mathematically given by the formula,

RBC = ((PC*PCA) +DCI+IFC+SFC)*ULC [10]

The other most popular software complexity theories include Halstead's complexity theory, Thomas J McCabe's Cyclomatic complexity theory, Klemola and RillingIt's KLCID Complexity measures & Henry and Kafura's fan-in /fan-out theory.

Maurice Halstead's measure of software complexity is based on the occurrences of the operators and operands in the code. These constitute the Length and Vocabulary of the program, which in turn are used to find the Volume, Effort and time to understand the software system. Halstead's complexity measure is theoretically computed using the following formulae,

Program Vocabulary, $n = n_1 + n_2$

Program Length, $N = N_1 + N_2$

Volume, $V = N * \log_2 n$

Estimated Program Length, $N^{\wedge} = n_1 \log_2 n_1 + n_2 \log_2 n_2$

Potential Volume, $V^* = (2 + n_2^*) \log_2 (2 + n_2^*)$

Program Level, $L = V^*/V$

Effort, $E = V/L$

in elementary mental discrimination.

Reasonable Time, $T = E/B$.

Min Difficulty = 1/language level

[6]

According to this theory, higher the value of effort, higher will be the software complexity. However, this is a difficult to compute method and is not recommended for fast and easy computation, because to count distinct operand and operator is not easy job.

Specifically when there are large programs [6]. Thomas J McCabe proposed a graphic metric complexity measure called the Cyclomatic Complexity. It is based on the

number of control paths in the code. In other words, it is the number of decision statements in the program + 1. In terms of a graph it is given by the formula:

V (G) = e-n +2p [7]

where G represents a graph with n vertices, e edges and p connected components.

McCabe's software complexity is computed using the formula,

C = 1+ $\sum_{n C G}$ (degree (n) -1) [7]

The difficulty with Mc Cabb Complexity is that, the complexity of an expression with in a conditional statement is never acknowledged. Also there is no penalty for embedded loops versus a series of single loops; both have the same complexity. [7]

The KLCID Complexity Metrics proposed by Klemola and RillingIt, is based on the identifier density.

It finds no. of unique lines of code. This method can become very time consuming when comparing a line of code with each line of the program. It also assumes the internal control structures for different Softwares to be the same. [8]

The identifier density (ID) is given by the formula,

ID = Total no: of identifiers / LOC [8]

Lines that have same type and kind of operands with same arrangements of operators would be considered equal. [8] and thus not unique. According to this theory, higher the identifier density, higher will be the software complexity.

Henry and Kafura came up with a theory of software complexity, as a function of fan-in and fan-out. According to them, fan-in meant the sum of the total number of local flows into a procedure and the total number of data structures from which that procedure retrieves information. Fan-out meant the sum of the total number of local flows out of the procedure and the number of data structures that the procedure updates. Local flows indicate the data that is passed to and from these procedures.

They thus concluded that, higher the flow, higher would be the complexity of the software.

All the discussed, theories have evident drawbacks making it necessary to come up with a well-defined novel software complexity theory.

EXPERIMENT

The experiment was conducted on 28 subjects online, but administered in person. The experiment aims to establish the importance of a well formed cognitive Software Complexity Theory. From the results of the experiment, we aim to state in fact that while algorithmic complexity contributes to software complexity, it does not majorly mean software complexity. We could also deduce that a reduction in the cognitive complexity would facilitate innovative software product development in terms of design features. The experiment was divided into two phases.

Phase 1:

The phase 1 part of the experiment, presented to the subjects is represented diagrammatically below:

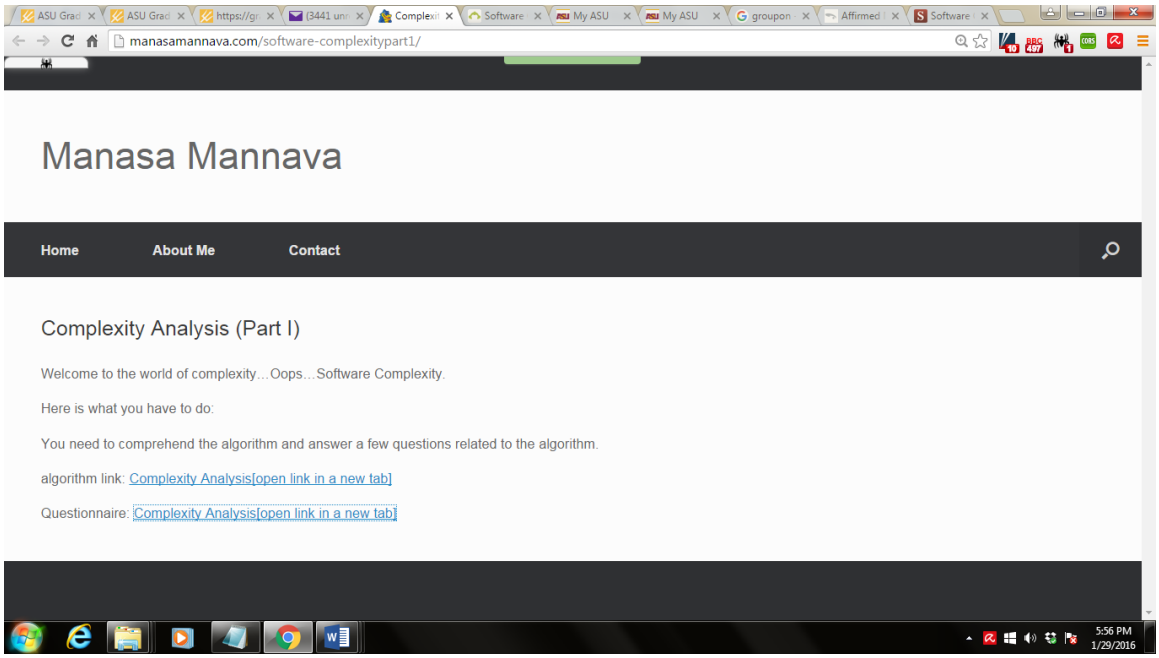


Figure 1: Complexity Analysis (Part I)

A link to the algorithm without any hints was provided to the subjects. The algorithm provided to the subjects in this phase, is presented below in the figures:

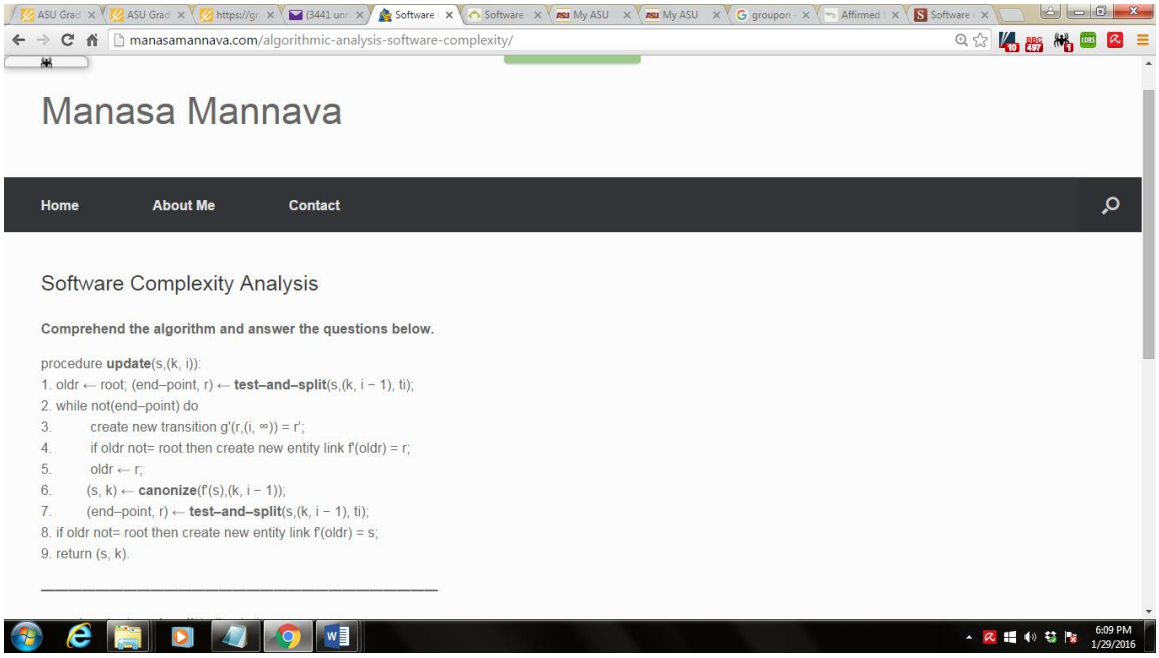


Figure 2.1: Algorithm Analysis

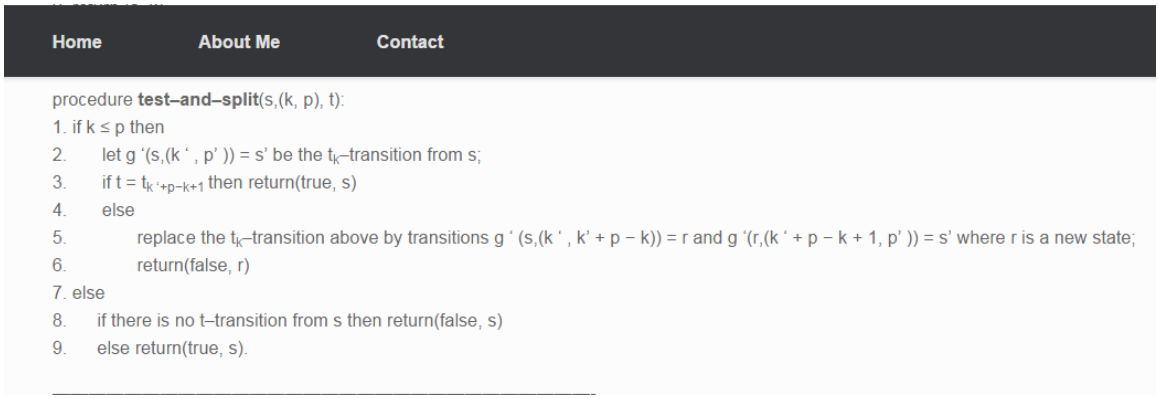


Figure 2.2: Algorithm Analysis

```
procedure canonize(s,(k, p)):
1. if p < k then return (s, k)
2. else
3.       find the tk–transition g 0 (s,(k ' , p' )) = s' from s;
4.       while p' – k' ≤ p – k do
5.              k ← k + p' – k' + 1;
6.              s ← s' ;
7.              if k ≤ p then find the tk–transition g' (s,(k' , p' )) = s' from s;
8. return (s, k).
```

Figure 2.3: Algorithm Analysis

The subjects had to comprehend the algorithm and answer 16 questions in the Questionnaire link provided to them.

The questions that were provided are presented below in figures.

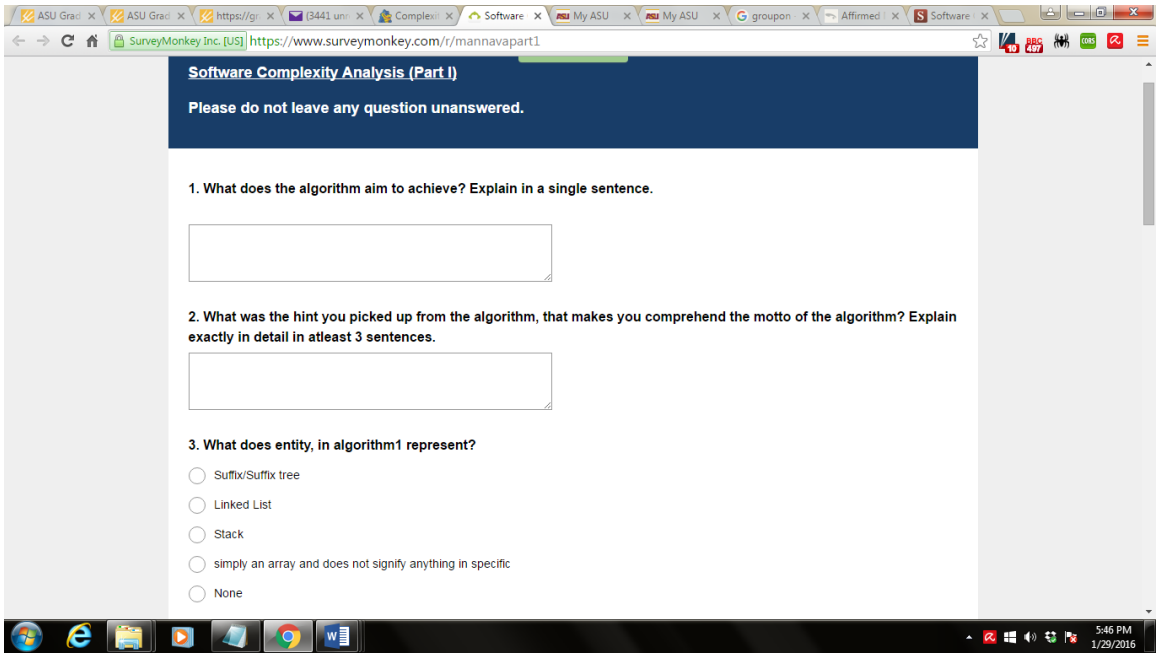


Figure 3.1: Complexity Analysis (Part I)

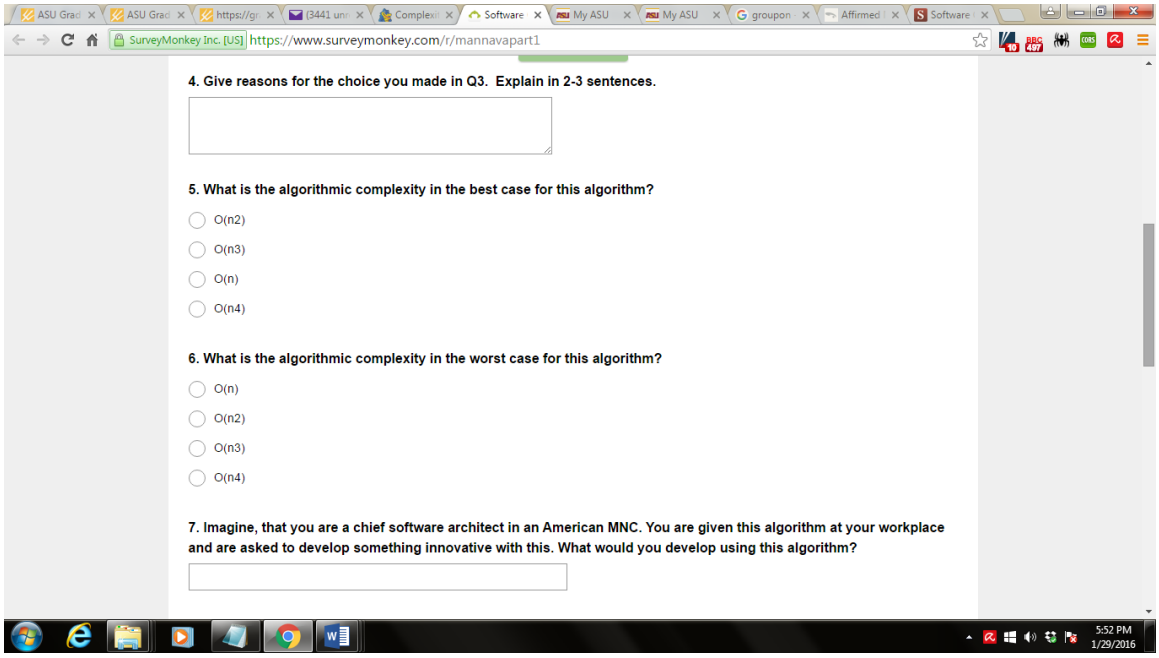


Figure 3.2: Complexity Analysis (Part I)

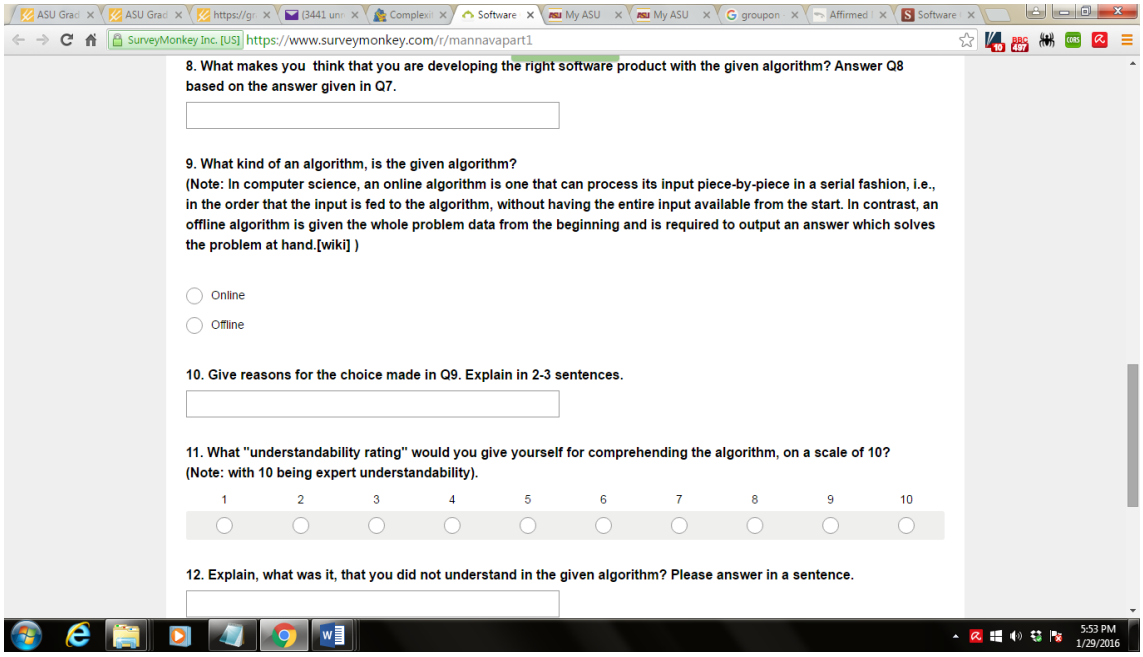


Figure 3.3: Complexity Analysis (Part I)

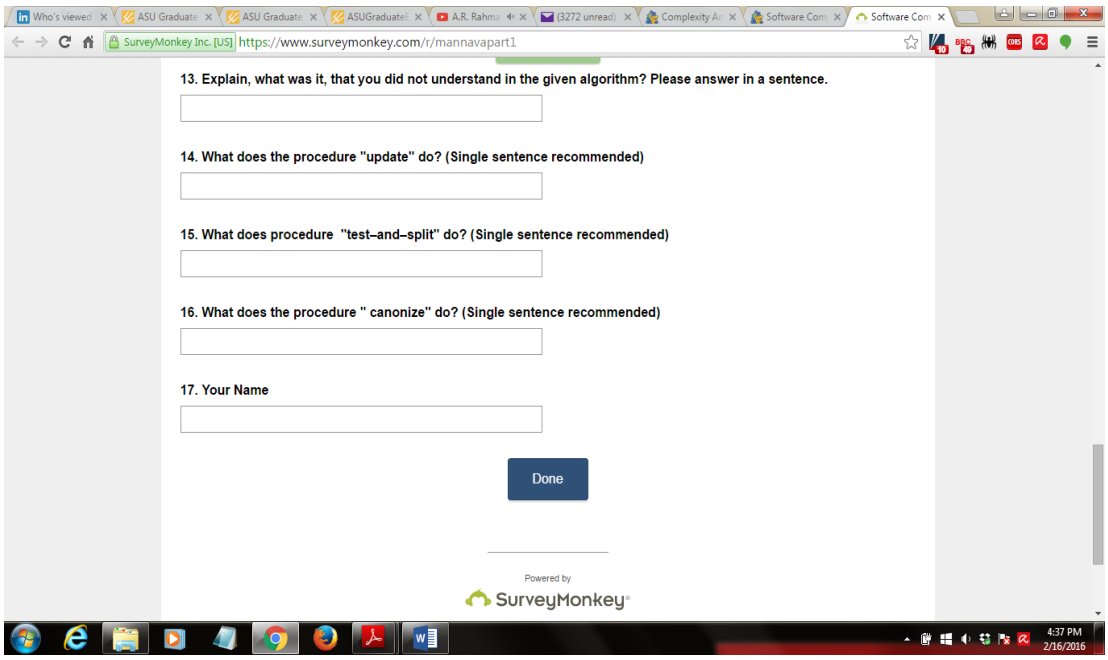


Figure 3.4: Complexity Analysis (Part I)

Phase 2:

The link to the phase 2 portion of the experiment was provided only after phase 1 responses of the respondents was recorded. This time, all the hints including a diagrammatical explanation of the algorithm was given to the subjects. This was done to reduce the cognitive complexity for the subjects. They had to answer 6 questions after getting a complete detailed description of the algorithm.

The details are presented in the figures below:

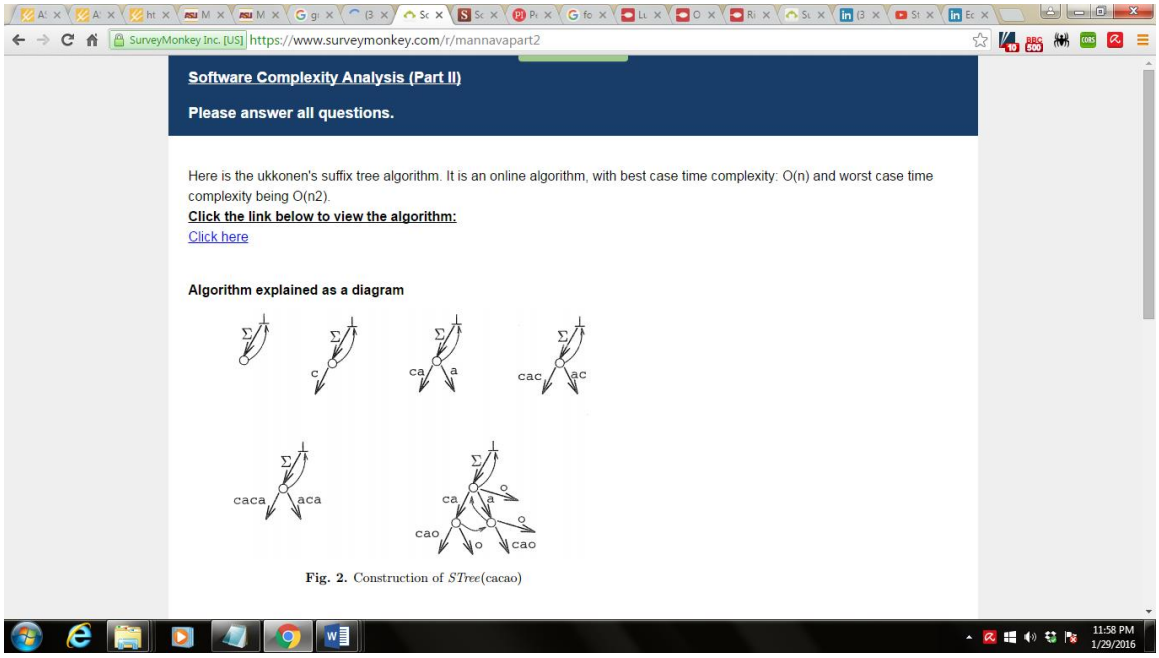


Figure 4.1: Complexity Analysis (part II)

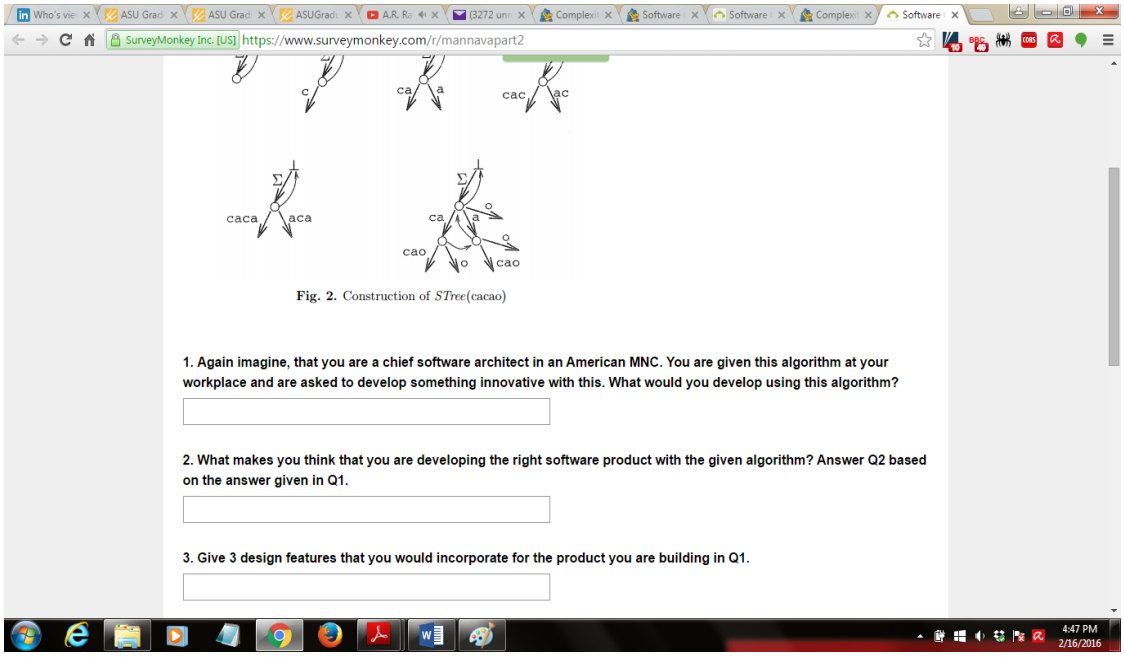


Figure 4.2: Complexity Analysis (Part II)

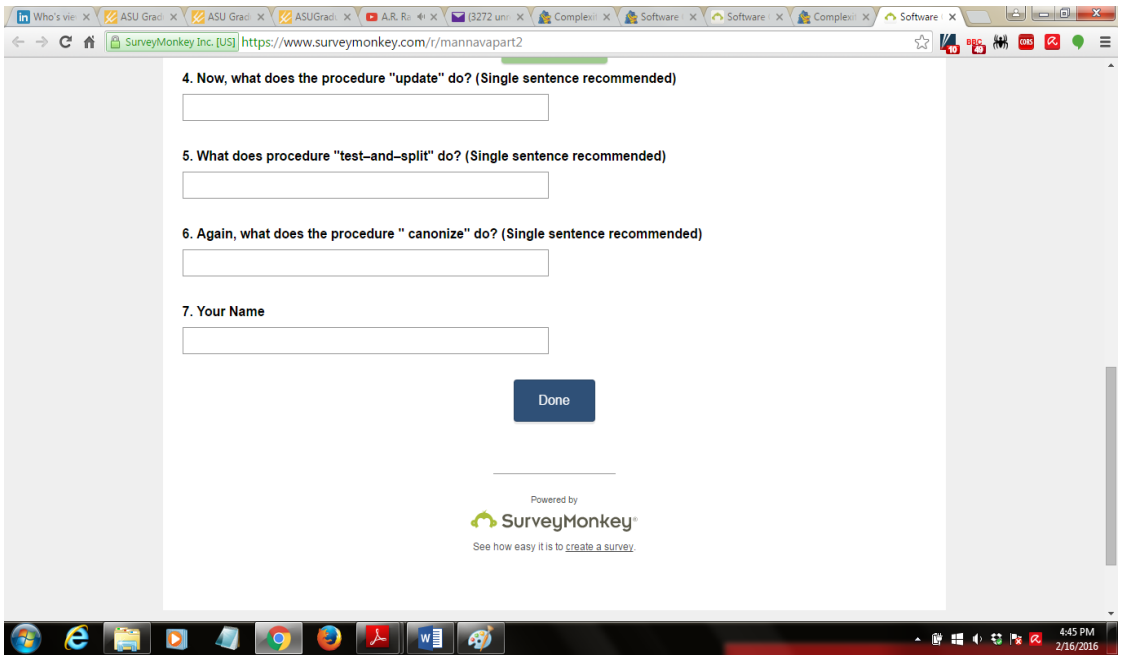


Figure 4.3: Complexity Analysis (Part II)

The responses for the part I and part II phase of the experiment was recorded and analyzed.

METHODOLOGY

Determination of Research Design

The data collected from phase 1 and phase 2 of the experiment is textual. As, a result of which, the grounded theory is being applied to analyze and evaluate the data to generate knowledge.

Research Design

Grounded Theory is a research tool which enables you to seek out and conceptualize the latent social patterns and structures of your area of interest through the process of constant comparison. [11]

The research has progressed in the following stages

Identification of the substantive area: This work focuses on establishing the importance of Cognitive Software Complexity. It states that, while algorithmic complexity is a subset of Software complexity, software complexity does not necessarily mean algorithmic Complexity. It is important to have a cognitive approach to reduce the complexity of a software. Thus cognitive complexity plays a crucial role to reduce software complexity. Another point that the experiment aims to put forward is that, reducing cognitive complexity would aid better/smarter and innovative software product development in terms of design features.

Data Collection: A unique website link was hosted, with phase 1 and phase 2 of the experiment available to the subjects. The subjects viewed the experiment only when provided the link, to eliminate bias. Link to phase 2 part of the experiment was provided to each of them only after their phase 1 results were recorded. The data for both parts of the experiment was collected using survey money tool.

Open Coding: Based on data collected for each of the phases of the experiment, color-coded categories were generated using the survey monkey data analytic tool. These categories were later assigned to each response after analyzing the response.

Visualization: Graphs & % have been generated based on the categories assigned to the responses after analysis.

Observations: The observations from the graph have been noted and results have been obtained.

DATA ANALYSIS

Profile of Respondents

The experiment was conducted with 28 subjects. All of them, are Software & Computer Science Graduate students at Arizona State University.

Data Collected & Observations Noted

Phase 1 had sixteen questions in total. The experiment results for phase 1 are presented below. While Q2, Q3, Q4, Q10, did not provide new knowledge. The analysis from Q1, Q5, Q6, Q7, Q8, Q9, and Q12 provide us some useful analysis. The detailed description and analysis is presented below.

Q1 what does the algorithm aim to achieve? Explain in a single sentence.

Description1: All the 28 subjects have answered this question. Based on the data from the collected responses for this question, categories have been generated using the survey monkey data analytic tool. The categories for this question, are as follows, 'above intermediate' color-coded in green, 'intermediate' color-coded in orange and 'low' color-coded in cyan. These categories represent the levels of understanding for each of the subjects. After analyzing the responses by each of the subjects, color-coded labels have been assigned, based on understandability of the given algorithm by the subjects. The results observed are presented below:

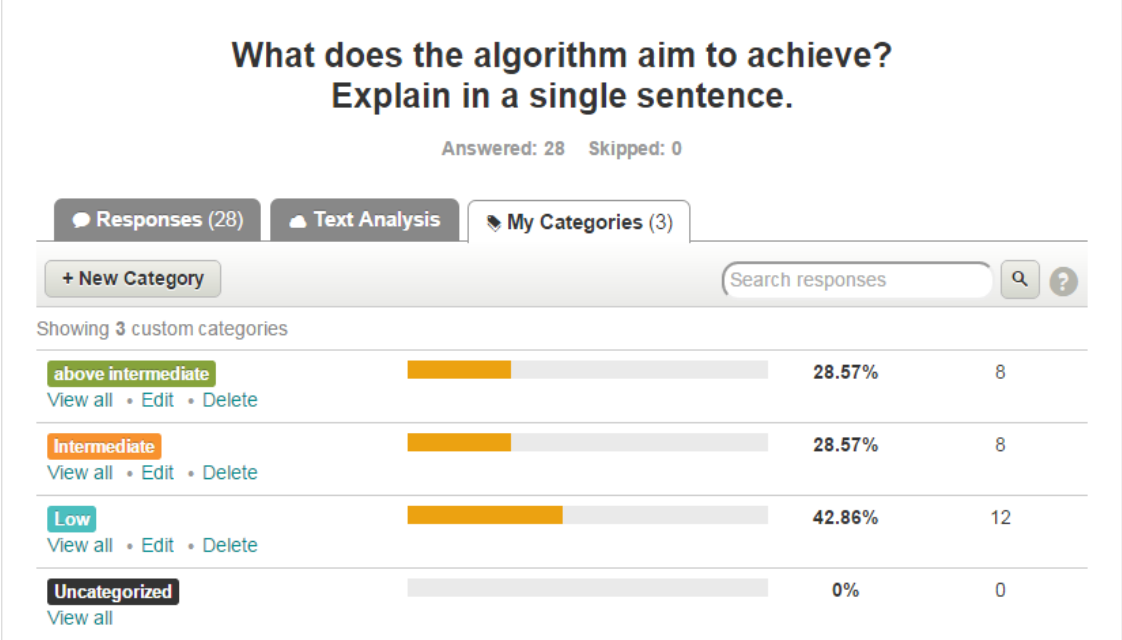
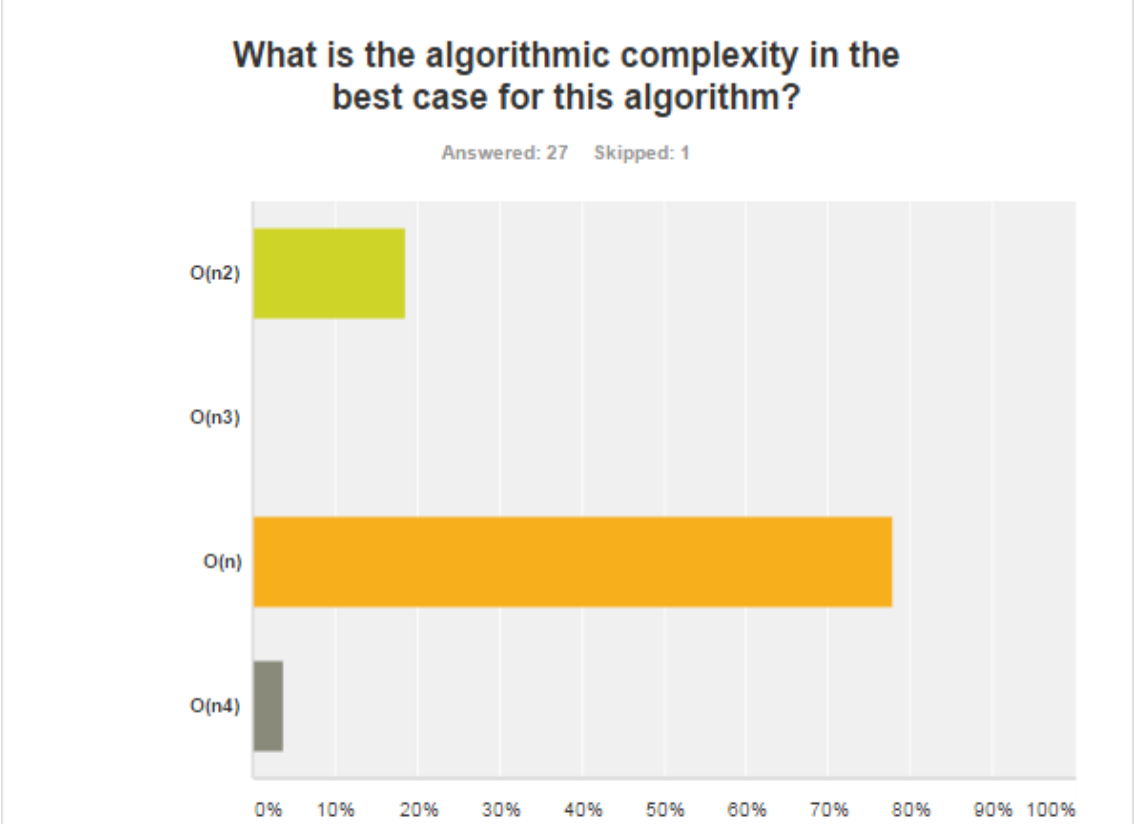


Figure 5.1: Phase 1 Question 1 Analysis

Analysis1: About 42.86 % had a low understandability about the algorithm. 28.57% had an intermediate level of understandability and 28.57 % had an above intermediate but not complete understandability about the algorithm given for comprehension. With low understandability being the highest %, we can conclude that a majority of the subjects did not comprehend the algorithm right.

Q5 what is the algorithmic complexity in the best case for the algorithm?

Description2: The number of respondents who answered this question is 27, with 1 respondent skipping this question. The results are presented below:



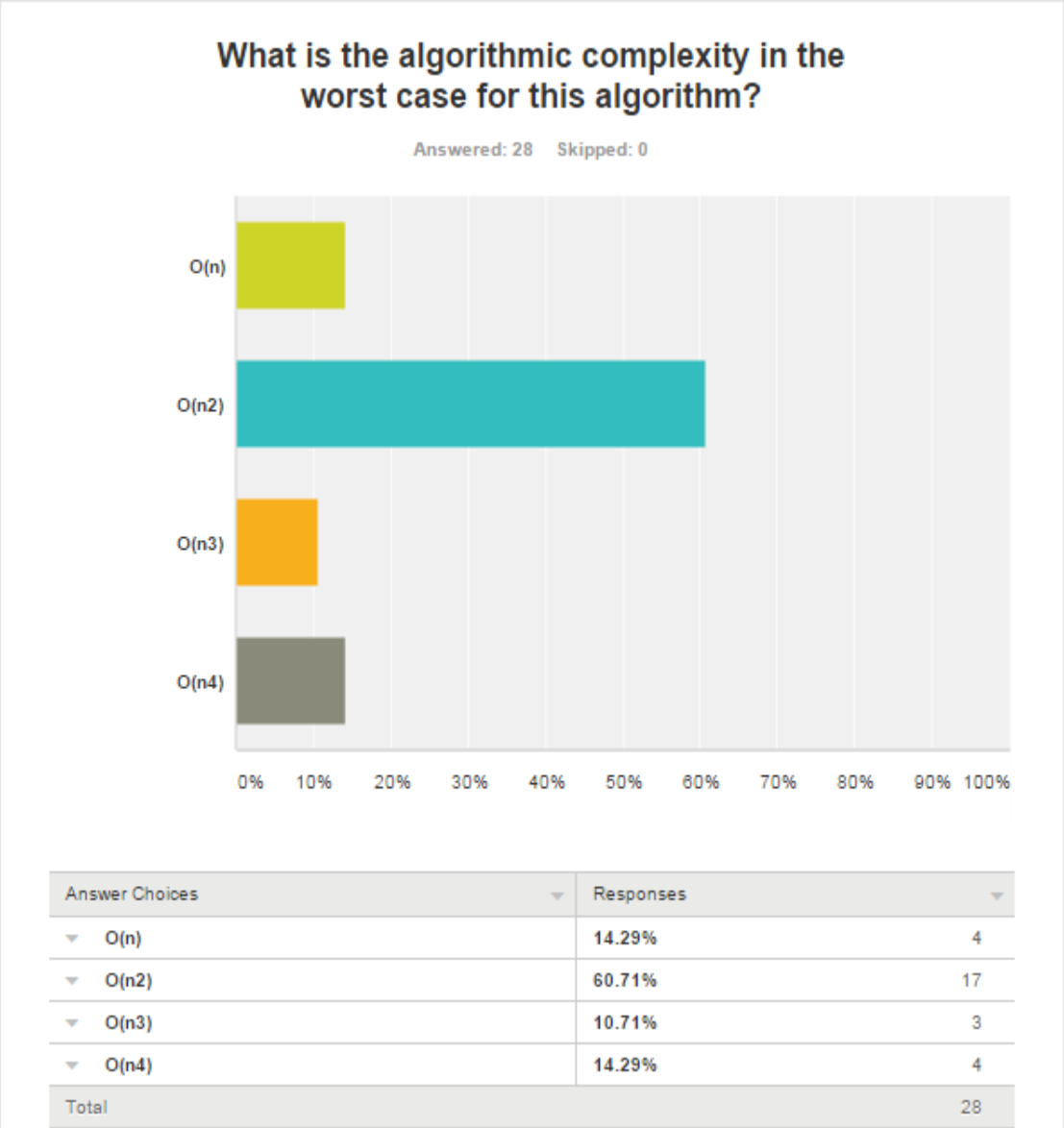
Answer Choices	Responses	
O(n2)	18.52%	5
O(n3)	0.00%	0
O(n)	77.78%	21
O(n4)	3.70%	1
Total		27

Figure 5.2: Phase 1 question 5 Analysis

Analysis2: About 77.78 % of the respondents have made the right choice about the best case time complexity of the given algorithm. 18.52% chose O (n^2), 0% chose O (n^3) and 3.7 % of them chose O (n^4). This suggests that, the subjects have a good understanding about the best case algorithmic time complexity. However, they had a low understanding of what the algorithm achieved based on the analysis from Q1.

Q6 what is the algorithmic complexity in the worst case for this algorithm?

Description3: All the 28 subjects answered this question. The results are presented below:



Answer Choices	Responses	
O(n)	14.29%	4
O(n2)	60.71%	17
O(n3)	10.71%	3
O(n4)	14.29%	4
Total		28

Figure 5.3 Phase 1 Question 6 Analysis

Analysis3: About 60.71 % of the respondents made the right choice about the worst case algorithmic time complexity of the given algorithm. 14.29 % of them chose O (n). 14.29 % chose O (n^4). 10.71 % chose O (n^3). This suggests that, the subjects have a good understanding about the worst case algorithmic time complexity.

However, they had a low understanding of what the algorithm achieved based on the analysis from Q1.

Theorem 1: While algorithmic complexity is a subset of Software Complexity, Software Complexity does not necessarily mean algorithmic Complexity. It is important to understand the algorithm in order to better estimate Software Complexity. Thus Cognitive Software complexity plays a crucial role to determine Software Complexity. [From Analysis1, Analysis2 & Analysis3]

Q7 Imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Description: About 24 respondents have answered this question, while 4 of them skipped this question. Based on the data from the collected responses for this question, categories have been generated using the survey monkey data analytic tool. The categories for this question, are as follows, 'innovative' color-coded in navy blue, 'No answer' color-coded in grey, 'no sense for given algorithm' color-coded in orange and 'worn' color-coded in green. These categories represent the type of idea, each subject had for developing software product with the given algorithm. After

analyzing the responses by each of the subjects, color-coded labels have been assigned. The results observed are presented below:

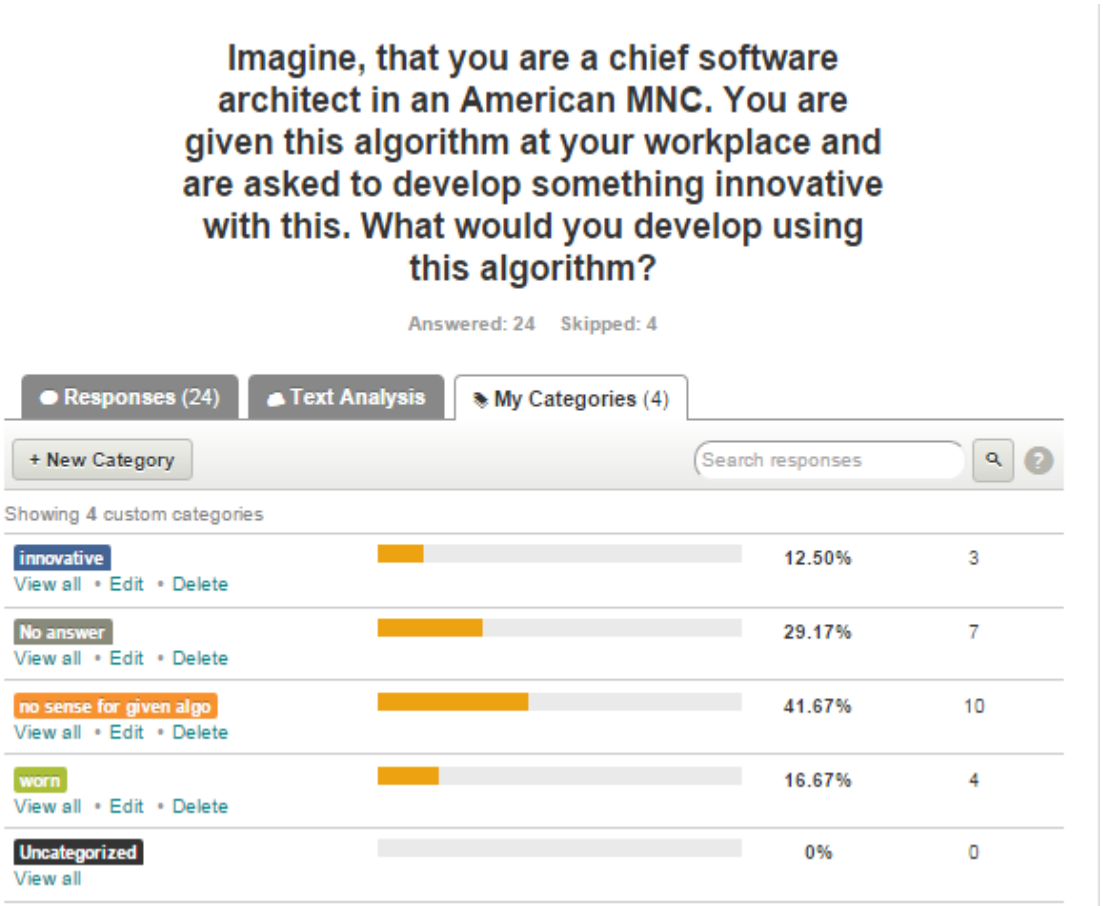


Figure 5.4 Phase 1 Question 7 Analysis

Analysis: About 41.67 % of the respondents had no sense of what the algorithm performed. 29.17 % of them mentioned nothing as their answer. 16.67 % of them had worn out ideas about the product they would build. 12.5 % had innovative ideas about the kind of product they would build with this algorithm. The same question

was presented to the subjects in phase 2 portion of the experiment and the results observed are as follows:

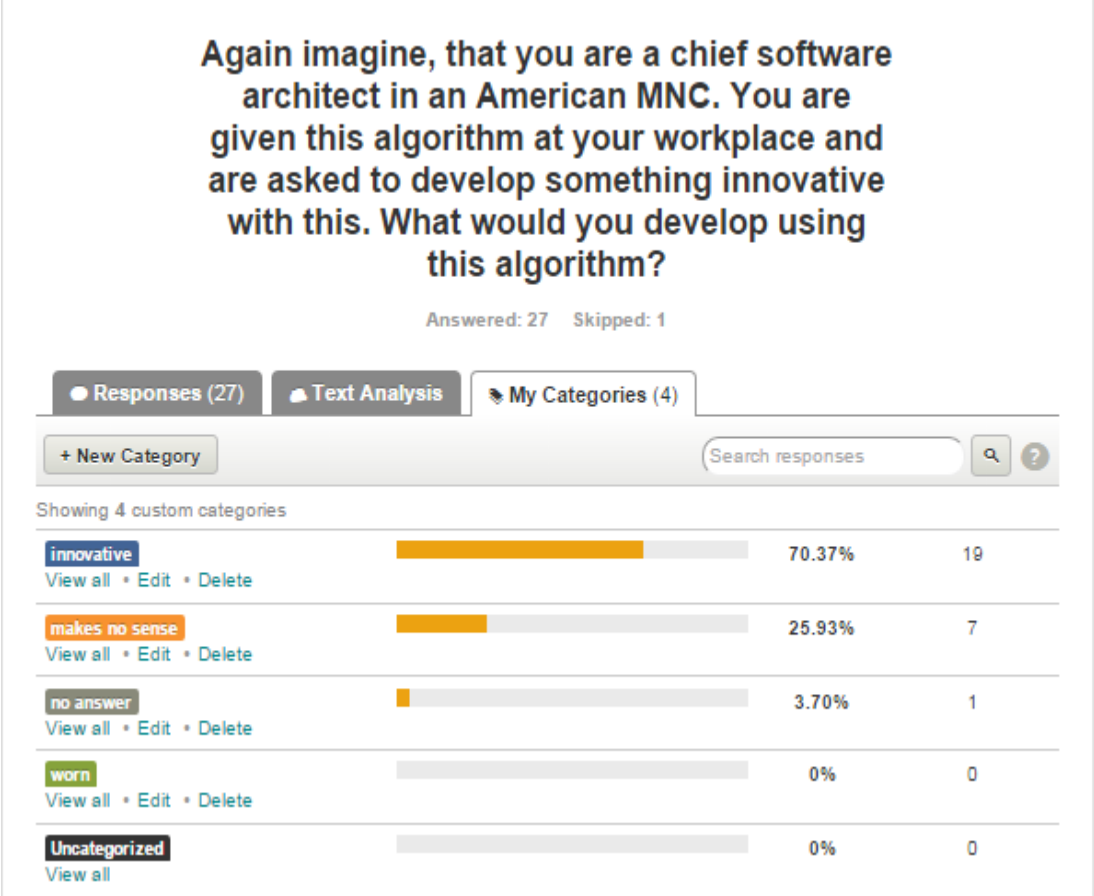


Figure 5.5 Phase 2 Question 1 Analysis

Analysis: About 70.37 % of the respondents this time had innovative ideas about what they would develop using this algorithm. For 25.93 % still could not make sense of an innovative software product that could be developed. 3.7 % mentioned no answer/ no-idea as their response. 0 % had worn out ideas. This means that, when cognitive complexity was reduced by providing hints and explanations about

the same algorithm, in the 2 phase of the experiment, subjects came up with innovative ideas to develop a software product of their choice using the algorithm.

Q8 Give 3 design features that you would incorporate for the product you are building in Q7.

Description: 21 respondents answered this question, while 7 of them skipped this question. Based on the data from the collected responses for this question, categories have been generated using the survey monkey data analytic tool. The categories for this question, are as follows, 'innovative' color-coded in navy blue, 'No answer' color-coded in grey, 'does not make sense' color-coded in orange and 'worn' color-coded in green. These categories represent the type of idea, each subject had for the design features of the software product, respondents planned to develop

using the algorithm. After analyzing the responses by each of the subjects, color-coded labels have been assigned. The results observed are presented below:

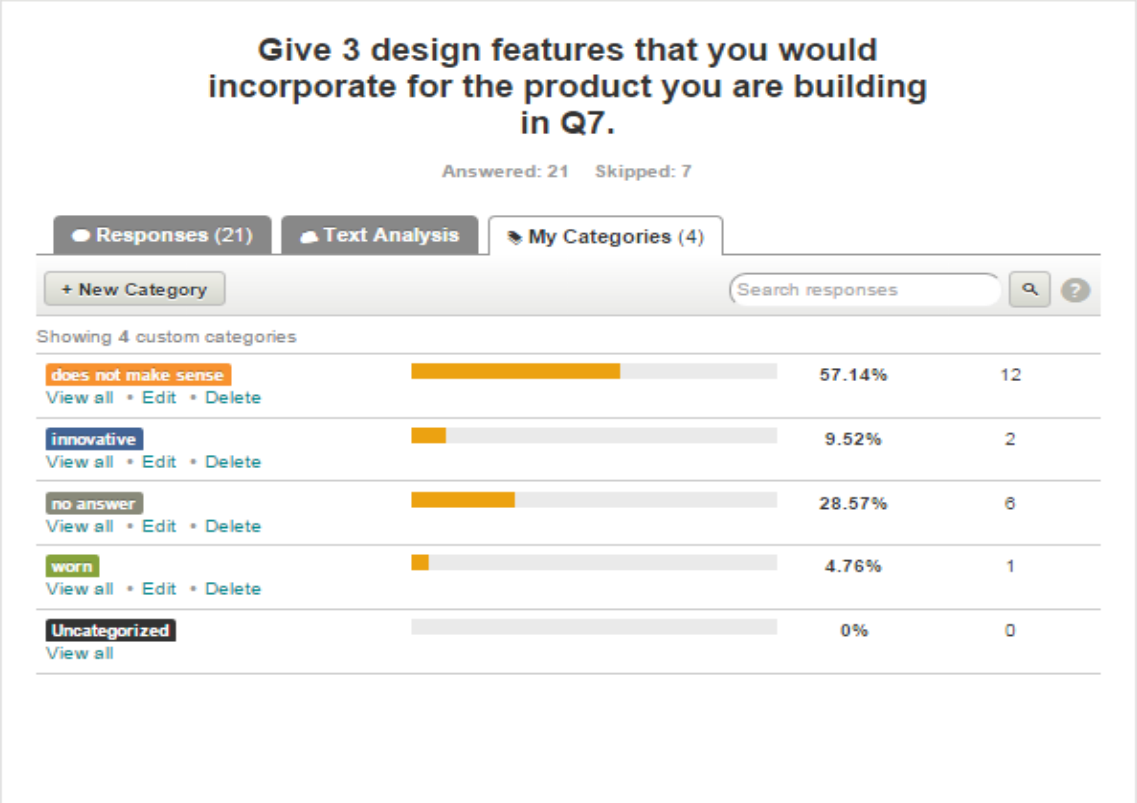


Figure 5.6 Phase 1 Question 8 Analysis

Analysis: 57.14 % did not make sense of the software pro they would develop, using the algorithm. 28.57 % had no idea/no answer of what they could potentially develop using the algorithm. 9.52 % had innovative design features for their product.

The same question was presented to the subjects in phase 2 portion of the experiment and the results observed are as follows:

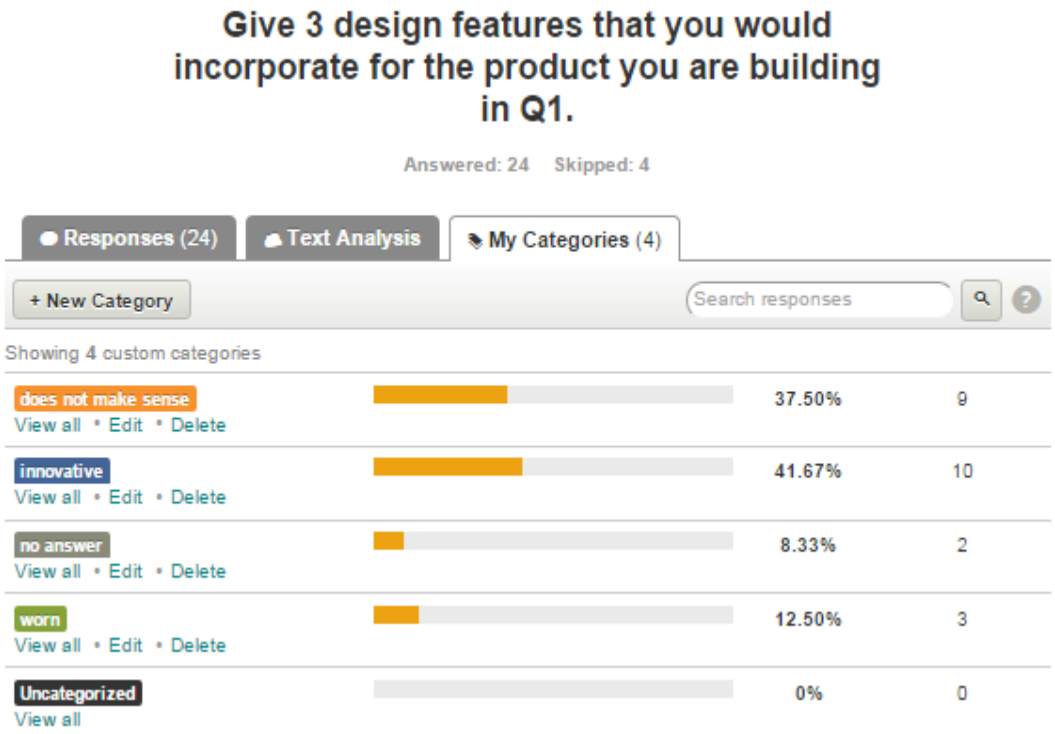


Figure 5.7 Phase 2 Question 3 Analysis

Analysis: In the 2 phase of the experiment, 37.5 % of the respondents did not make sense of the design features they would incorporate for the product they planned to develop. 41.67 % of them now have innovative design features for the product, 8.33 % did not have any idea/ no answer for this question, 12.5 % had worn out design features. The number of respondents who answered this question has increased from 21 to 24. Also, the % of 'does not make sense' had gone down in phase 2, from 57.14 % in phase 1 to 37.5 % in phase 2. The % of 'innovative' has increased from 9.52 % in phase 1 to 41.67 % in phase 2. Also the % of 'innovative' has beaten the % 'does not make sense' in phase 2. This clearly suggests that, reducing cognitive complexity of software would aid better, smarter and innovative product development in terms of design features.

Theorem 2: Reducing Cognitive Software Complexity facilitates smarter and innovative software product development in terms of design features.

Summary Discussion: Based on the results observed from the experiment, we can summarize the following observations:

a) While algorithmic complexity is a subset of Software Complexity, Software Complexity does not necessarily mean algorithmic Complexity. It is important to understand the algorithm in order to better estimate Software Complexity. Thus Cognitive Software complexity plays a crucial role to determine Software Complexity.

b) Reducing Cognitive Software Complexity facilitates smarter and innovative software product development in terms of design features.

CONCLUSION AND FUTURE SCOPE

The experiment results from both Phase I and Phase II, established the importance of cognitive complexity for software. Modern day Industrial Software is a combination of algorithms implemented. For this reason, the ukkonen's suffix tree algorithm was analyzed, as a part of the experiment to evaluate software from a cognitive perspective. This brought to light that while algorithmic time complexity is crucial to understand software complexity, it is not the only metric to evaluate software complexity.

Software complexity is very profound, and not understanding the software makes it complex. This summarizes that, while algorithmic time complexity is a part of software complexity, software complexity does not entirely mean algorithmic space and time complexity. The second most important deduction from the observations of both the phases of the experiment was that, reducing Cognitive Complexity, aided better and creative ideas to develop Software. In the first phase of the experiment, the subjects could not come up with innovative ideas and features for the product they would develop using ukkonen's algorithm. However, in phase II, by adding hints and explanations about the algorithm, in attempts to reduce cognitive complexity, subjects came up with creative ideas and design features for the product they wished to develop.

The research work could further be extended in terms to determining the increase in the creative quotient upon reducing Cognitive Complexity and what is the optimal Cognitive Reduction value. The optimal reduction value should be that value by which the Cognitive Complexity should be reduced to obtain a valuable increase in

the Creative Quotient of the Software Product. Creative Quotient is the measure of how creative or innovative a software product is.

Future work could be done on measuring the effects of reducing Cognitive Complexity and the impact it would have, on Software complexity on the whole. As the Cognitive Complexity is reduced, the developer understands the system better. Better understanding the system enables him/her to make better and right choices. Accidental complexity, thus reduces when the right choices are made during the development phase. Experiments and analysis could be done to confirm that reducing cognitive complexity reduces accidental complexity for software developers. Similarly, the impact with regard to other types of existing Software Complexity metrics could be determined. Determination of a formula to quantify Cognitive Complexity could also be done, from the data collected through experiments.

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APPENDIX A

EXPERIMENT RESULTS (PHASE 1)

Respondent 1

Q1: What does the algorithm aim to achieve? Explain in a single sentence.

Answer: Trying to construct a suffix tree

Q2: What was the hint you picked up from the algorithm that makes you comprehend the motto of the algorithm? Explain exactly in detail in at least 3 sentences.

Answer: Need to iterate through each node and if it matches then add it to the suffix tree.

Q3: What does entity, in algorithm1 represent?

Answer: Suffix/Suffix tree

Q4: Give reasons for the choice you made in Q3. Explain in 2-3 sentences.

Answer: The algorithm works in steps and from left to right.

There is one step for every character in a string.

The goal is to add all the suffixes to the tree

Q5: What is the algorithmic complexity in the best case for this algorithm?

Answer: O (n)

Q6: What is the algorithmic complexity in the worst case for this algorithm?

Answer: O (n2)

Q7: Imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: It is a testing procedure to implement a static online market tool

Q8: Give 3 design features that you would incorporate for the product you are building in Q7.

Answer: Respondent skipped this question

Q9: What makes you think that you are developing the right software product with the given algorithm? Answer Q9 based on the answer given in Q7.

Answer: Since this algorithm involves constructing step by step, hence we can build a static tool which depends on various factors.

Q10: What kind of an algorithm, is the given algorithm? (Note: In computer science, an online algorithm is one that can process its input piece-by-piece in a serial fashion, i.e., in the order that the input is fed to the algorithm, without having the entire input available from the start. In contrast, an offline algorithm is given the whole problem data from the beginning and is required to output an answer which solves the problem at hand. [Wiki])

Answer: Online

Q11: Give reasons for the choice made in Q9. Explain in 2-3 sentences.

Answer: Since this algorithm involved updating step by step and then coming up with tree. Hence I think it is online.

Q12: What "understandability rating" would you give yourself for comprehending the algorithm, on a scale of 10? (Note: with 10 being expert understandability).

Answer: 5

Q13: Explain, what was it that you did not understand in the given algorithm? Please answer in a sentence.

Answer: test and split procedure

Q14: What does the procedure "update" do? (Single sentence recommended)

Answer: It updates a new transition and tries to create a link with the tree

Q15: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: This procedure used to create multiple splits from the main problem.

Q16: What does the procedure "canonize" do? (Single sentence recommended)

This procedure is used during special cases like when the starting character is more.

Q17: Your Name

Answer: Respondent skipped this question

Respondent 2:

Q1: What does the algorithm aim to achieve? Explain in a single sentence.

Answer: Best and optimal way to transition from one state to other given a set of points.

Q2: What was the hint you picked up from the algorithm that makes you comprehend the motto of the algorithm? Explain exactly in detail in at least 3 sentences.

Answer: if there is no t–transition from s then return (false, s). This says that u can't do a transition if the points you are picking is

Incorrect, i.e. if p > k.

Q3: What does entity, in algorithm1 represent?

Answer: None

Q4: Give reasons for the choice you made in Q3. Explain in 2-3 sentences.

Answer: looks like once the state is identified, we are trying to save the state in the entity. if oldr not = root, we are setting oldr ← r; entity refers to the new root or new reference .

Q5: What is the algorithmic complexity in the best case for this algorithm?

Answer: O (n)

Q6: What is the algorithmic complexity in the worst case for this algorithm?

Answer: O (n2)

Q7: Imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: find an optimal way for a solution, may be identify the cost of developing a product and using this algorithm to find out the best way to get there by getting maximum benefits and lowering the cost

Q8: Give 3 design features that you would incorporate for the product you are building in Q7.

Answer: flexibility, maintainability,

Q9: What makes you think that you are developing the right software product with the given algorithm? Answer Q9 based on the answer given in Q7.

Answer: I think we can't make sure that we are developing the right product until we implement it

Q10: What kind of an algorithm, is the given algorithm? (Note: In computer science, an online algorithm is one that can process its input piece-by-piece in a serial fashion, i.e., in the order that the input is fed to the algorithm, without having the entire input available from the start. In contrast, an offline algorithm is given the whole problem data from the beginning and is required to output an answer which solves the problem at hand. [Wiki])

Answer: Offline

Q11: Give reasons for the choice made in Q9. Explain in 2-3 sentences.

Answer: The optimal choice it picks depends only on the data that it has at present, if new data comes in, then the previous transition it picks is not optimal

Q12: What "understandability rating" would you give yourself for comprehending the algorithm, on a scale of 10? (Note: with 10 being expert understandability).

Answer: 7

Q13: Explain, what was it that you did not understand in the given algorithm? Please answer in a sentence.

Answer: if k ≤ p then find the tk–transition g’ (s,(k’ , p’)) = s’ from s; we have already found out an optimal/better transition, Im not sure why we are doing this again.

Q14: What does the procedure "update" do? (Single sentence recommended)

Answer: optimal points to transition from one state to other

Q15: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: Find out all possible transitions from one state to other, using the set of points.

Q16: What does the procedure "canonize" do? (Single sentence recommended)

Answer: Canonize picks the best/optimal way to transition from one state to other.

Q17: Your Name

Answer: Respondent skipped this question

Respondent 3:

Q1: What does the algorithm aim to achieve? Explain in a single sentence.

Answer: Given the points its updating it by splitting the points and calculating tk transition.

Q2: What was the hint you picked up from the algorithm that makes you comprehend the motto of the algorithm? Explain exactly in detail in at least 3 sentences.

Answer: I looked at the return statement of the main program to check that its updating the points. Then I went through helper functions to check what exactly happening inside and what they are returning. In each helper function it was trying to find the tk transition.

Q3: What does entity, in algorithm1 represent?

Answer: None

Q4: Give reasons for the choice you made in Q3. Explain in 2-3 sentences.

Answer: Respondent skipped this question

Q5: What is the algorithmic complexity in the best case for this algorithm?

Answer: Respondent skipped this question

Q6: What is the algorithmic complexity in the worst case for this algorithm?

Answer: O (n)

Q7: Imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: I did not understand what exactly the tk transition is. So Implementing would be difficult unless I understand what tk transition does.

Q8: Give 3 design features that you would incorporate for the product you are building in Q7.

Answer: Understanding tk transition is important.

Q9: What makes you think that you are developing the right software product with the given algorithm? Answer Q9 based on the answer given in Q7.

Answer: Understanding tk transition is important

Q10: What kind of an algorithm, is the given algorithm? (Note: In computer science, an online algorithm is one that can process its input piece-by-piece in a serial fashion, i.e., in the order that the input is fed to the algorithm, without having the entire input available from the start. In contrast, an offline algorithm is given the whole problem data from the beginning and is required to output an answer which solves the problem at hand. [Wiki])

Answer: Offline

Q11: Give reasons for the choice made in Q9. Explain in 2-3 sentences.

Answer: Respondent skipped this question

Q12: What "understandability rating" would you give yourself for comprehending the algorithm, on a scale of 10? (Note: with 10 being expert understandability).

Answer: (no label) 5

Q13: Explain, what was it,that you did not understand in the given algorithm? Please answer in a sentence.

Answer: tk transition

Q14: What does the procedure "update" do? (Single sentence recommended)

Answer: updates the given points and returns.

Q15: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: it calculates tk transition by transition g depending on the condition and returns true or false and s.

Q16: What does the procedure "canonize" do? (Single sentence recommended)

Answer: calculates tk transition and returns points.

Q17: Your Name

Answer: Respondent skipped this question

Respondent 4:

Q1: What does the algorithm aim to achieve? Explain in a single sentence.

Answer: Splitting of text in a paragraph - text alignment

Q2: What was the hint you picked up from the algorithm that makes you comprehend the motto of the algorithm? Explain exactly in detail in at least 3 sentences.

Answer: test-and-split method call in the update method

Q3: What does entity, in algorithm1 represent?

Answer: Linked List

Q4: Give reasons for the choice you made in Q3. Explain in 2-3 sentences.

Answer: text in a paragraph can be easily deleted and added at any given position

Q5: What is the algorithmic complexity in the best case for this algorithm?

Answer: O (n2)

Q6: What is the algorithmic complexity in the worst case for this algorithm?

Answer: O (n)

Q7: Imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: text conversion tool.

Q8: Give 3 design features that you would incorporate for the product you are building in Q7.

Answer: indentation, capitalizing of first alphabet

Q9: What makes you think that you are developing the right software product with the given algorithm? Answer Q9 based on the answer given in Q7.

Answer: it can easily convert text from other languages and identify where to provide indentations and breaks.

Q10: What kind of an algorithm, is the given algorithm? (Note: In computer science, an online algorithm is one that can process its input piece-by-piece in a serial fashion, i.e., in the order that the input is fed to the algorithm, without having the entire input available from the start. In contrast, an offline algorithm is given the whole problem data from the beginning and is required to output an answer which solves the problem at hand. [wiki])

Answer: Online

Q11: Give reasons for the choice made in Q9. Explain in 2-3 sentences.

Answer: that's the easiest application I could think of.

Q12: What "understandability rating" would you give yourself for comprehending the algorithm, on a scale of 10? (Note: with 10 being expert understandability).

Answer: 5

Q13: Explain, what was it that you did not understand in the given algorithm? Please answer in a sentence.

Answer: canonize method

Q14: What does the procedure "update" do? (Single sentence recommended)

Answer: Updates the linked list with a new word at the end of a line and start of a new line.

Q15: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: Checks if a word can be split at a given position.

Q16: What does the procedure "canonize" do? (Single sentence recommended)

Answer: I don't know.

Q17: Your Name

Answer: Respondent skipped this question

Respondent 5:

Q1: What does the algorithm aim to achieve? Explain in a single sentence.

Answer: update the array to satisfy the tk-transition

Q2: What was the hint you picked up from the algorithm that makes you comprehend the motto of the algorithm? Explain exactly in detail in at least 3 sentences.

Answer: the (if else), the structure of the code, the function name

Q3: What does entity, in algorithm1 represent?

Answer: Linked List

Q4: Give reasons for the choice you made in Q3. Explain in 2-3 sentences.

Answer: Because we'll traverse again and again to test, if this is link list, it can be easily insert into new list.

Q5: What is the algorithmic complexity in the best case for this algorithm?

Answer: O (n)

Q6: What is the algorithmic complexity in the worst case for this algorithm?

Answer: O (n2)

Q7: Imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: data transmission

Q8: Give 3 design features that you would incorporate for the product you are building in Q7.

Answer: security, check, safety

Q9: What makes you think that you are developing the right software product with the given algorithm? Answer Q9 based on the answer given in Q7.

Answer: this algorithm will update the every piece of data

Q10: What kind of an algorithm, is the given algorithm? (Note: In computer science, an online algorithm is one that can process its input piece-by-piece in a serial fashion, i.e., in the order that the input is fed to the algorithm, without having the entire input available from the start. In contrast, an offline algorithm is given the whole problem data from the beginning and is required to output an answer which solves the problem at hand. [Wiki])

Answer: Online

Q11: Give reasons for the choice made in Q9. Explain in 2-3 sentences.

Answer: we will update data piece by piece, there is no need to know the whole program.

Q12: What "understandability rating" would you give yourself for comprehending the algorithm, on a scale of 10? (Note: with 10 being expert understandability).

Answer: 2

Q13: Explain, what was it that you did not understand in the given algorithm? Please answer in a sentence.

Answer: the pseudocode coed seems so difficult, and I don't know what the tk-transition is.

Q14: What does the procedure "update" do? (Single sentence recommended)

Answer: in order to make every data piece satisfy the tk transition

Q15: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: test every data piece to know whether it satisfy the requirement

Q16: What does the procedure "canonize" do? (Single sentence recommended)

Answer: change the data part to satisfy the requirement.

Q17: Your Name

Answer: Wenbo Tian

Respondent 6:

Q1: What does the algorithm aim to achieve? Explain in a single sentence.

Answer: Updating a suffix tree.

Q2: What was the hint you picked up from the algorithm, that makes you comprehend the motto of the algorithm? Explain exactly in detail in atleast 3 sentences.

Answer: Keywords like root, transition, create new entity link and state.

Q3: What does entity, in algorithm1 represent?

Answer: Suffix/Suffix tree

Q4: Give reasons for the choice you made in Q3. Explain in 2-3 sentences.

Answer: Keywords like root, transition, create new entity link and state.

Q5: What is the algorithmic complexity in the best case for this algorithm?

Answer: O (n)

Q6: What is the algorithmic complexity in the worst case for this algorithm?

Answer: O (n4)

Q7: Imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: Given algorithm can be incorporated to parse characters.

Q8: Give 3 design features that you would incorporate for the product you are building in Q7.

Answer: Respondent skipped this question

Q9: What makes you think that you are developing the right software product with the given algorithm? Answer Q9 based on the answer given in Q7.

Answer: Respondent skipped this question

Q10: What kind of an algorithm, is the given algorithm? (Note: In computer science, an online algorithm is one that can process its input piece-by-piece in a serial fashion, i.e., in the order that the input is fed to the algorithm, without having the entire input available from the start. In contrast, an offline algorithm is given the whole problem data from the beginning and is required to output an answer which solves the problem at hand. [Wiki])

Answer: Online

Q11: Give reasons for the choice made in Q9. Explain in 2-3 sentences.

Answer: We are starting with the root and are making new transitions.

Q12: What "understandability rating" would you give yourself for comprehending the algorithm, on a scale of 10? (Note: with 10 being expert understandability).

Answer: 2

Q13: Explain, what was it that you did not understand in the given algorithm? Please answer in a sentence.

Answer: Expression evaluation. The purpose of each function.

Q14: What does the procedure "update" do? (Single sentence recommended)

Answer: Updates the suffix tree.

Q15: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: Finds the place where the update can be done.

Q16: What does the procedure "canonize" do? (Single sentence recommended)

Answer: Does the necessary transitions to find correct s.

Q17: Your Name

Answer: Sameer Srinivas

Respondent 7:

Q1: What does the algorithm aim to achieve? Explain in a single sentence.

Answer: It aims to create a data structure of some sort (maybe a tree like structure).

Q2: What was the hint you picked up from the algorithm that makes you comprehend the motto of the algorithm? Explain exactly in detail in at least 3 sentences.

Answer: Hint I picked in this algorithm is that the algorithm is trying to create a data structure and trying to update it. There are state transitions in this data structure which are getting updated.

Q3: What does entity, in algorithm1 represent?

Answer: Suffix/Suffix tree

Q4: Give reasons for the choice you made in Q3. Explain in 2-3 sentences.

Answer: From the looks of it, there is a root node, a transition from one node to other and linkages which made me think of it as tree like structure.

Q5: What is the algorithmic complexity in the best case for this algorithm?

Answer: O (n)

Q6: What is the algorithmic complexity in the worst case for this algorithm?

Answer: O (n2)

Q7: Imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: I did not understand the algorithm clearly. I will need to somehow get the idea of what the algorithm is doing and then I can apply it.

Q8: Give 3 design features that you would incorporate for the product you are building in Q7.

Answer: If I could build something, I would list the design features.

Q9: What makes you think that you are developing the right software product with the given algorithm? Answer Q9 based on the answer given in Q7.

Answer: I am not sure.

Q10: What kind of an algorithm, is the given algorithm? (Note: In computer science, an online algorithm is one that can process its input piece-by-piece in a serial fashion, i.e., in the order that the input is fed to the algorithm, without having the entire input available from the start. In contrast, an offline algorithm is given the whole problem data from the beginning and is required to output an answer which solves the problem at hand. [Wiki])

Answer: Offline

Q11: Give reasons for the choice made in Q9. Explain in 2-3 sentences.

Answer: I am not sure.

Q12: What "understandability rating" would you give yourself for comprehending the algorithm, on a scale of 10? (Note: with 10 being expert understandability).

Answer: 2

Q13: Explain, what was it that you did not understand in the given algorithm? Please answer in a sentence.

Answer: I could not understand what is going on in this algorithm.

Q14: What does the procedure "update" do? (Single sentence recommended)

Answer: either creates a node or updates it, it also runs in a loop which contains some condition

Q15: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: splits the transition from one state to other

Q16: What does the procedure "canonize" do? (Single sentence recommended)

Answer: I think its checking some condition, p

Q17: Your Name

Answer: Mandar Patwardhan

Respondent 8:

Q1: What does the algorithm aim to achieve? Explain in a single sentence.

Answer: I am not sure

Q2: What was the hint you picked up from the algorithm that makes you comprehend the motto of the algorithm? Explain exactly in detail in at least 3 sentences.

Answer: NA

Q3: What does entity, in algorithm1 represent?

Answer: Suffix/Suffix tree

Q4: Give reasons for the choice you made in Q3. Explain in 2-3 sentences.

Answer: We have a root node

Q5: What is the algorithmic complexity in the best case for this algorithm?

Answer: O (n)

Q6: What is the algorithmic complexity in the worst case for this algorithm?

Answer: O (n2)

Q7: Imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: NA

Q8: Give 3 design features that you would incorporate for the product you are building in Q7.

Answer: NA

Q9: What makes you think that you are developing the right software product with the given algorithm? Answer Q9 based on the answer given in Q7.

Answer: I am not sure of the algorithm

Q10: What kind of an algorithm, is the given algorithm? (Note: In computer science, an online algorithm is one that can process its input piece-by-piece in a serial fashion, i.e., in the order that the input is fed to the algorithm, without having the entire input available from the start. In contrast, an offline algorithm is given the whole problem data from the beginning and is required to output an answer which solves the problem at hand. [Wiki])

Answer: Offline

Q11: Give reasons for the choice made in Q9. Explain in 2-3 sentences.

Answer: Respondent skipped this question

Q12: What "understandability rating" would you give yourself for comprehending the algorithm, on a scale of 10? (Note: with 10 being expert understandability).

Answer: 1

Q13: Explain, what was it that you did not understand in the given algorithm? Please answer in a sentence.

Answer: Respondent skipped this question

Q14: What does the procedure "update" do? (Single sentence recommended)

Answer: Respondent skipped this question

Q15: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: Respondent skipped this question

Q16: What does the procedure "canonize" do? (Single sentence recommended)

Answer: Respondent skipped this question

Q17: Your Name

Answer: Chinmay

Respondent 9:

Q1: What does the algorithm aim to achieve? Explain in a single sentence.

Answer: It looks like an algorithm to update or add data in a suffix tree.

Q2: What was the hint you picked up from the algorithm that makes you comprehend the motto of the algorithm? Explain exactly in detail in at least 3 sentences.

Answer: The first hint is the root, which hints that it is a tree. And second is the arguments passed to the functions.

Q3: What does entity, in algorithm1 represent?

Answer: None

Q4: Give reasons for the choice you made in Q3. Explain in 2-3 sentences.

Answer: As, I mentioned in the question 2 for the reasons given it looks like a add or update function of a suffix tree. Hence, the entity seems like a node of the tree or suffix.

Q5: What is the algorithmic complexity in the best case for this algorithm?

Answer: O (n2)

Q6: What is the algorithmic complexity in the worst case for this algorithm?

Answer: O (n2)

Q7: Imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: Respondent skipped this question

Q8: Give 3 design features that you would incorporate for the product you are building in Q7.

Answer: Respondent skipped this question

Q9: What makes you think that you are developing the right software product with the given algorithm? Answer Q9 based on the answer given in Q7**.**

Answer: Respondent skipped this question

Q10: What kind of an algorithm, is the given algorithm? (Note: In computer science, an online algorithm is one that can process its input piece-by-piece in a serial fashion, i.e., in the order that the input is fed to the algorithm, without having the entire input available from the start. In contrast, an offline algorithm is given the whole problem data from the beginning and is required to output an answer which solves the problem at hand. [Wiki])

Answer: Online

Q11: Give reasons for the choice made in Q9. Explain in 2-3 sentences.

Answer: As in suffix tree, we input data piece by piece into the tree.

Q12: What "understandability rating" would you give yourself for comprehending the algorithm, on a scale of 10? (Note: with 10 being expert understandability).

Answer: 3

Q13: Explain, what was it that you did not understand in the given algorithm? Please answer in a sentence.

Answer: I had difficulty understanding what the test and split and canonize functions do.

Q14: What does the procedure "update" do? (Single sentence recommended)

Answer: Add /update node in a suffix tree

Q15: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: Don’t know

Q16: What does the procedure "canonize" do? (Single sentence recommended)

Answer: Don't know

Q17: Your Name

Answer: Avani Chandurkar

Respondent 10:

Q1: What does the algorithm aim to achieve? Explain in a single sentence.

Answer: The algorithm aims to update a data structure, checks if the current element is a root or not, and does transition by calling canonize and test-and-split functions.

Q2: What was the hint you picked up from the algorithm that makes you comprehend the motto of the algorithm? Explain exactly in detail in at least 3 sentences.

Answer: First, the function names tells me that the algorithm is trying to update a data structure. Second, the algorithm is calling the two functions to complete the required task. Third, the functions being called are outside the callee function, which indicates that the callee function is main function.

Q3: What does entity, in algorithm1 represent?

Answer: None

Q4: Give reasons for the choice you made in Q3. Explain in 2-3 sentences.

Answer: The algorithm intuitively tells that it is updating some sort of data structure, but does not specifically follows a conventional model. Also, there are no comments for any line of code presented to tell what is being done. All the information is being deciphered mostly by function names.

Q5: What is the algorithmic complexity in the best case for this algorithm?

Answer: O (n)

Q6: What is the algorithmic complexity in the worst case for this algorithm?

Answer: O (n2)

Q7: Imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: Some tool which involves iterative methodology.
Scheduling tool.

Q8: Give 3 design features that you would incorporate for the product you are building in Q7.

Answer: Calender, Time manager, login-logout functionality.

Q9: What makes you think that you are developing the right software product with the given algorithm? Answer Q9 based on the answer given in Q7.

Answer: The functions in the algorithm starts with checking of the current element and proceeds accordingly. In a scheduling tool it would be necessary to deal with every date/hour which the algorithm would do.

Q10: What kind of an algorithm, is the given algorithm? (Note: In computer science, an online algorithm is one that can process its input piece-by-piece in a serial fashion, i.e., in the order that the input is fed to the algorithm, without having the entire input available from the start. In contrast, an offline algorithm is given the

whole problem data from the beginning and is required to output an answer which solves the problem at hand. [Wiki])

Answer: Offline

Q11: Give reasons for the choice made in Q9. Explain in 2-3 sentences.

Answer: Reason is that the algorithm takes a sequential approach which would ensure that a scheduling tool does not miss and day/time while performing its tasks.

Q12: What "understandability rating" would you give yourself for comprehending the algorithm, on a scale of 10? (Note: with 10 being expert understandability).

Answer: 3

Q13: Explain, what was it that you did not understand in the given algorithm? Please answer in a sentence.

Answer: No comments in the algorithm makes it difficult to understand.

Q14: What does the procedure "update" do? (Single sentence recommended)

Answer: Checks for the root, if true calls test-and-splits if the element is endpoint. If not, then until the end point is reached, it will create new transition, if the element is not a root -> mark it root, and then call procedure canonize and then test-and-split.

Q15: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: checks the condition, and performs actions accordingly.

Q16: What does the procedure "canonize" do? (Single sentence recommended)

Answer: checks for condition and runs a while loop.

Q17: Your Name

Answer: Salil Batra

Respondent 11:

Q1: What does the algorithm aim to achieve? Explain in a single sentence.

Answer: Algorithm aims to achieve the successor of a particular node in a suffix tree after deletion.

Q2: What was the hint you picked up from the algorithm that makes you comprehend the motto of the algorithm? Explain exactly in detail in at least 3 sentences.

Answer: At various point of the algorithm, the steps aims to find the transitions of nodes and compares its value with other nodes. It tries to find a new root of the tree. And determines the endpoint or leaf node.

Q3: What does entity, in algorithm1 represent?

Answer: Suffix/Suffix tree

Q4: Give reasons for the choice you made in Q3. Explain in 2-3 sentences.

Answer: It talks about transition functions and also about root.

Q5: What is the algorithmic complexity in the best case for this algorithm?

Answer: O (n4)

Q6: What is the algorithmic complexity in the worst case for this algorithm?

Answer: O (n4)

Q7: Imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: A recommendation system based on user preference.

Q8: Give 3 design features that you would incorporate for the product you are building in Q7.

Answer: Readability, reusability, scalability

Q9: What makes you think that you are developing the right software product with the given algorithm? Answer Q9 based on the answer given in Q7.

Answer: It deals with transitions and forms a sort of tree like data structure which actually might be required in developing a software recommendation system.

Q10: What kind of an algorithm, is the given algorithm? (Note: In computer science, an online algorithm is one that can process its input piece-by-piece in a serial fashion, i.e., in the order that the input is fed to the algorithm, without having the entire input available from the start. In contrast, an offline algorithm is given the whole problem data from the beginning and is required to output an answer which solves the problem at hand.

[Wiki])

Answer: Offline

Q11: Give reasons for the choice made in Q9. Explain in 2-3 sentences.

Answer: I can find relationships between various user preferred Objects or entities using this algorithm.

Q12: What "understandability rating" would you give yourself for comprehending the algorithm, on a scale of 10? (Note: with 10 being expert understandability).

Answer: (no label) 6

Q13: Explain, what was it that you did not understand in the given algorithm? Please answer in a sentence.

Answer: The signature style of the method parameters.

Q14: What does the procedure "update" do? (Single sentence recommended)

Answer: It updates the tree structure based on the current values returned by canonize and test-and-split methods.

Q15: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: It checks if the particular node is leaf node else it just splits it and continues with the deeper transitions.

Q16: What does the procedure "canonize" do? (Single sentence recommended)

Answer: Canonize returns the normalized value of s and k after checking against some conditions.

Q17: Your Name

Answer: Abir Saha

Respondent 12:

Q1: What does the algorithm aim to achieve? Explain in a single sentence.

Answer: It is an algorithm to divide the tree into multiple subtree based on some parameters

Q2: What was the hint you picked up from the algorithm that makes you comprehend the motto of the algorithm? Explain exactly in detail in at least 3 sentences.

Answer: 1. Naming convention. Root is usually used in reference to tree/graph. Question 3 gave me clarity that it is tree. 2. test and split conveys that the algorithm divides the tree into multiple subtrees.

Q3: What does entity, in algorithm1 represent?

Answer: Suffix/Suffix tree

Q4: Give reasons for the choice you made in Q3. Explain in 2-3 sentences**.**

Answer: [Reusing the answer from second question]

1. Naming convention. Root is usually used in reference to tree/graph. Question 3 gave me clarity that it is tree. 2. test and split conveys that the algorithm divides the tree into multiple subtrees.

Q5: What is the algorithmic complexity in the best case for this algorithm?

Answer: O (n)

Q6: What is the algorithmic complexity in the worst case for this algorithm?

Answer: O (n2)

Q7: Imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: If this is a subtree generation algorithm, I would use it to create remote file system hierarchy for NFS.

Q8: Give 3 design features that you would incorporate for the product you are building in Q7.

Answer: 1. Redundancy 2. Coherence 3. Response time

Q9: What makes you think that you are developing the right software product with the given algorithm? Answer Q9 based on the answer given in Q7.

Answer: In NFS, a server holds the filesystem and the remote clients would mount the fs just like their own. This procedure might be a good way for server to distribute the subtrees to clients.

Q10: What kind of an algorithm, is the given algorithm? (Note: In computer science, an online algorithm is one that can process its input piece-by-piece in a serial fashion, i.e., in the order that the input is fed to the algorithm, without having the entire input available from the start. In contrast, an offline algorithm is given the whole problem data from the beginning and is required to output an answer which solves the problem at hand. [Wiki])

Answer: Offline

Q11: Give reasons for the choice made in Q9. Explain in 2-3 sentences.

Answer: I think it's offline since the data is readily available and no checks on the availability is made.

Q12: What "understandability rating" would you give yourself for comprehending the algorithm, on a scale of 10? (Note: with 10 being expert understandability).

Answer: (no label) 1

Q13: Explain, what was it, that you did not understand in the given algorithm? Please answer in a sentence.

Answer: I did not understand the notation used in test and split.

Q14: What does the procedure "update" do? (Single sentence recommended)

Answer: Create new subtree by splitting an existing tree.

Q15: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: Based on certain entities, test and split the tree.

Q16: What does the procedure "canonize" do? (Single sentence recommended)

Answer: Creates a new subtree by combining various nodes.

Q17: Your Name

Answer: Vignesh Kannan

Respondent: 13

Q1: What does the algorithm aim to achieve? Explain in a single sentence.

Answer: This algorithm is trying to update a tree data structure with given data.

Q2: What was the hint you picked up from the algorithm that makes you comprehend the motto of the algorithm? Explain exactly in detail in at least 3 sentences.

Answer: The name of the procedure. The loop where the data structure is being traversed till the end to find the the given location. The input data is updated in the existing data structure with two helper algorithms.

Q3: What does entity, in algorithm1 represent?

Answer: Suffix/Suffix tree

Q4: Give reasons for the choice you made in Q3. Explain in 2-3 sentences.

Answer: A root is being used in the algorithm. The procedure test and split splits the original data structure into root and end point.

Q5: What is the algorithmic complexity in the best case for this algorithm?

Answer: O (n)

Q6: What is the algorithmic complexity in the worst case for this algorithm?

Answer: O (n2)

Q7: Imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: Some string manipulations or for search. This "string" can be some DNA or musical notes. Update it with the given input.

Q8: Give 3 design features that you would incorporate for the product you are building in Q7.

Answer: To look for some pattern in a string, search for a particular string, see where all a given pattern is present. Update the "string" with given input and view the result of the manipulation

Q9: What makes you think that you are developing the right software product with the given algorithm? Answer Q9 based on the answer given in Q7.

Answer: The main motto of the algorithm is updating. We are using this feature in the given product.

Q10: What kind of an algorithm, is the given algorithm? (Note: In computer science, an online algorithm is one that can process its input piece-by-piece in a serial fashion, i.e., in the order that the input is fed to the algorithm, without having the entire input available from the start. In contrast, an offline algorithm is given the

whole problem data from the beginning and is required to output an answer which solves the problem at hand. [Wiki])

Answer: Online

Q11: Give reasons for the choice made in Q9. Explain in 2-3 sentences.

Answer: The main motto of the algorithm is updating. We are using this feature in the given product.

Q12: What "understandability rating" would you give yourself for comprehending the algorithm, on a scale of 10? (Note: with 10 being expert understandability).

Answer: 6

Q13: Explain, what was it that you did not understand in the given algorithm? Please answer in a sentence.

Answer: The intricate details of each step

Q14: What does the procedure "update" do? (Single sentence recommended)

Answer: This algorithm is trying to update a tree data structure with given data.

Q15: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: Splitting the data structure into root and endpoint

Q16: What does the procedure "canonize" do? (Single sentence recommended)

Answer: I am not very sure

Q17: Your Name

Answer: Marutaro

Respondent 14:

Q1: What does the algorithm aim to achieve? Explain in a single sentence.

Answer: The algorithm seems to be updating a node of a data structure that seems to be a tree. The "update" function assigns the root of the tree to a variable

"oldr" and split it further by calling function "test and split". The function "canonize" seems to be calculating the value of the node.

Q2: What was the hint you picked up from the algorithm that makes you comprehend the motto of the algorithm? Explain exactly in detail in at least 3 sentences.

Answer: The "update" function hints by its name that it is possibly updating a data structure. Same goes for "test and split". It tests the node for a condition and if it is met, the node is split. For the function canonize, I felt since it takes in a function f'(s) as parameter when it is called, it could be dealing with the value of the node.

Q3: What does entity, in algorithm1 represent?

Answer: Suffix/Suffix tree

Q4: Give reasons for the choice you made in Q3. Explain in 2-3 sentences.

Answer: Since the function "update" seems to be dealing with roots and also splitting them using "test-and-split", I suppose it is a tree of some kind.

Q5: What is the algorithmic complexity in the best case for this algorithm?

Answer: O (n)

Q6: What is the algorithmic complexity in the worst case for this algorithm?

Answer: O (n4)

Q7: Imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: This could be used to create a tool that keeps track of ongoing projects in the company. If one project has multiple branches, they could fit in with the splitting

procedure.

Q8: Give 3 design features that you would incorporate for the product you are building in Q7.

Answer: 1. Make the project the root and 2. split it on some basis like, department, in-charge/head, or resources used. 3. The values of each could be the name of the department along with staff and work details, or the amount of money it uses and details of resources/expenditure.

Q9: What makes you think that you are developing the right software product with the given algorithm? Answer Q9 based on the answer given in Q7.

Answer: I think splitting the details of a project based on a condition like department or budget makes sense.

Q10: What kind of an algorithm, is the given algorithm? (Note: In computer science, an online algorithm is one that can process its input piece-by-piece in a serial fashion, i.e., in the order that the input is fed to the algorithm, without having the entire input available from the start. In contrast, an offline algorithm is given the whole problem data from the beginning and is required to output an answer which solves the problem at hand. [Wiki])

Answer: Online

Q11: Give reasons for the choice made in Q9. Explain in 2-3 sentences.

Answer: Connections can be well kept using a tree.

Q12: What "understandability rating" would you give yourself for comprehending the algorithm, on a scale of 10? (Note: with 10 being expert understandability).

Answer: (no label) 5

Q13: Explain, what was it that you did not understand in the given algorithm? Please answer in a sentence.

Answer: I did not understand the word "canonize" and just made a guess judging from the parameters it takes in. It would've helped me understand better if the parameter data types were known to me.

Q14: What does the procedure "update" do? (Single sentence recommended)

Answer: Update the value of a node in a tree.

Q15: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: Tests a node on some condition and splits it further.

Q16: What does the procedure "canonize" do? (Single sentence recommended)

Answer: Calculates the value for each node that is involved in splitting, the one being split and the new ones emerging.

Q17: Your Name

Answer: Aveesha Sharma

Respondent 15:

Q1: What does the algorithm aim to achieve? Explain in a single sentence.

Answer: creates new entities

Q2: What was the hint you picked up from the algorithm that makes you comprehend the motto of the algorithm? Explain exactly in detail in at least 3 sentences.

Answer: Respondent skipped this question

Q3: What does entity, in algorithm1 represent?

Answer: Stack

Q4: Give reasons for the choice you made in Q3. Explain in 2-3 sentences.

Answer: Respondent skipped this question

Q5: What is the algorithmic complexity in the best case for this algorithm?

Answer: O (n)

Q6: What is the algorithmic complexity in the worst case for this algorithm?

Answer: O (n3)

Q7: Imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: Respondent skipped this question

Q8: Give 3 design features that you would incorporate for the product you are building in Q7.

Answer: Respondent skipped this question

Q9: What makes you think that you are developing the right software product with the given algorithm? Answer Q9 based on the answer given in Q7**.**

Answer: Respondent skipped this question

Q10: What kind of an algorithm, is the given algorithm? (Note: In computer science, an online algorithm is one that can process its input piece-by-piece in a serial fashion, i.e., in the order that the input is fed to the algorithm, without having the entire input available from the start. In contrast, an offline algorithm is given the whole problem data from the beginning and is required to output an answer which solves the problem at hand. [Wiki])

Answer: Online

Q11: Give reasons for the choice made in Q9. Explain in 2-3 sentences.

Answer: it will take data as needed and keep on serially executing

Q12: What "understandability rating" would you give yourself for comprehending the algorithm, on a scale of 10? (Note: with 10 being expert understandability).

Answer: (no label) 2

Q13: Explain, what was it that you did not understand in the given algorithm? Please answer in a sentence.

Answer: transition to new state and its utility

Q14: What does the procedure "update" do? (Single sentence recommended)

Answer: it assigns root as oldr, calls test and split, based on its result if its not the end point, then it creates an entity otherwise it checks till end point is reached by giving test and split method new transition and checks value of oldr to be root and by canonize method

Q15: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: it checks if k < p and if its not then it splits into two new states.

Q16: What does the procedure "canonize" do? (Single sentence recommended)

Answer: it checks if p < k and if not it finds a new value of k and reaches a new state s

Q17: Your Name

Answer: Meenal Kulkarni

Respondent 16:

Q1: What does the algorithm aim to achieve? Explain in a single sentence.

Answer: transitions in a suffix

Q2: What was the hint you picked up from the algorithm that makes you comprehend the motto of the algorithm? Explain exactly in detail in at least 3 sentences.

Answer: the algo tries to: transition within the suffix tree, tries to find possible transition to make, and create new transition in a suffix

Q3: What does entity, in algorithm1 represent?

Answer: Suffix/Suffix tree

Q4: Give reasons for the choice you made in Q3. Explain in 2-3 sentences.

Answer: there is root to start and then we transition along a path

Q5: What is the algorithmic complexity in the best case for this algorithm?

Answer: O (n)

Q6: What is the algorithmic complexity in the worst case for this algorithm?

Answer: O (n2)

Q7: Imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: no idea

Q8: Give 3 design features that you would incorporate for the product you are building in Q7.

Answer: no idea

Q9: What makes you think that you are developing the right software product with the given algorithm? Answer Q9 based on the answer given in Q7.

Answer: not in depth understanding for the algorithm and its application

Q10: What kind of an algorithm, is the given algorithm? (Note: In computer science, an online algorithm is one that can process its input piece-by-piece in a serial fashion, i.e., in the order that the input is fed to the algorithm, without having the entire input available from the start. In contrast, an offline algorithm is given the whole problem data from the beginning and is required to output an answer which solves the problem at hand. [Wiki])

Answer: Online

Q11: Give reasons for the choice made in Q9. Explain in 2-3 sentences.

Answer: algorithm represents a part of the data structure without enumerating much details of its other parts

Q12: What "understandability rating" would you give yourself for comprehending the algorithm, on a scale of 10? (Note: with 10 being expert understandability).

Answer: (no label) 1

Q13: Explain, what was it that you did not understand in the given algorithm? Please answer in a sentence.

Answer: variable declarations and flow

Q14: What does the procedure "update" do? (Single sentence recommended)

Answer: finding new transitions in a suffix

Q15: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: give true or false if transition from s exists

Q16: What does the procedure "canonize" do? (Single sentence recommended)

Answer: transitions from s

Q17: Your Name

Answer: Nitin Goel

Respondent 17:

Q1: What does the algorithm aim to achieve? Explain in a single sentence.

Answer: The algorithm updates a tree be testing if k<= p. If not, then it replaces the old transition with a new one.

Q2: What was the hint you picked up from the algorithm that makes you comprehend the motto of the algorithm? Explain exactly in detail in at least 3 sentences.

Answer: The names of the functions gave some hints as well as some of the text written in each function

Q3: What does entity, in algorithm1 represent?

Answer: Suffix/Suffix tree

Q4: Give reasons for the choice you made in Q3. Explain in 2-3 sentences.

Answer: In order for this entity to be updates, it needed to split first. This sounds like what you would do to update a tree.

Q5: What is the algorithmic complexity in the best case for this algorithm?

Answer: O (n)

Q6: What is the algorithmic complexity in the worst case for this algorithm?

Answer: O (n)

Q7: Imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: Updating any data in the form of a tree

Q8: Give 3 design features that you would incorporate for the product you are building in Q7.

Answer: Update and summarize

Q9: What makes you think that you are developing the right software product with the given algorithm? Answer Q9 based on the answer given in Q7.

Answer: I will need to test it first to know if this was the right algorithm for this kind of software.

Q10: What kind of an algorithm, is the given algorithm? (Note: In computer science, an online algorithm is one that can process its input piece-by-piece in a serial fashion, i.e., in the order that the input is fed to the algorithm, without having the entire input available from the start. In contrast, an offline algorithm is given the whole problem data from the beginning and is required to output an answer which solves the problem at hand. [Wiki])

Answer: Online

Q11: Give reasons for the choice made in Q9. Explain in 2-3 sentences.

Answer: Because I'm not sure I fully understand the algorithm

Q12: What "understandability rating" would you give yourself for comprehending the algorithm, on a scale of 10? (Note: with 10 being expert understandability).

Answer: (no label) 3

Q13: Explain, what was it that you did not understand in the given algorithm? Please answer in a sentence.

Answer: What s, p, k, i, g stand for.

Q14: What does the procedure "update" do? (Single sentence recommended)

Answer: Updates the tree by calling split & test and canonize

Q15: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: Replaces the old transitions with new ones (smaller ones)

Q16: What does the procedure "canonize" do? (Single sentence recommended)

Answer: Not Sure.

Q17: Your Name

Answer: Zahra

Respondent 18:

Q1: What does the algorithm aim to achieve? Explain in a single sentence.

Answer: Tries to grow a tree by looking for possible transitions and creating links to make these transitions.

Q2: What was the hint you picked up from the algorithm that makes you comprehend the motto of the algorithm? Explain exactly in detail in at least 3 sentences.

Answer: The variables root, the creation of transitions, and entity links. The function test-and-split gives an idea, that there are functions that take in values, test them, and make transitions based on that. The function canonize indicates the basis on which transitions are created, and then fed back to update.

Q3: What does entity, in algorithm1 represent?

Answer: Linked List

Q4: Give reasons for the choice you made in Q3. Explain in 2-3 sentences.

Answer: I think that a linked list is created to traverse. I don't know what a suffix tree is, so I couldn't choose that. I have no proof for my answer, I simply eliminated other choices because a linked list seems more natural.

Q5: What is the algorithmic complexity in the best case for this algorithm?

Answer: O (n)

Q6: What is the algorithmic complexity in the worst case for this algorithm?

Answer: O (n)

Q7: Imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: Do not understand it sufficiently.

Q8: Give 3 design features that you would incorporate for the product you are building in Q7.

Answer: Do not understand it sufficiently.

Q9: What makes you think that you are developing the right software product with the given algorithm? Answer Q9 based on the answer given in Q7.

Answer: Do not understand it sufficiently.

Q10: What kind of an algorithm, is the given algorithm? (Note: In computer science, an online algorithm is one that can process its input piece-by-piece in a serial fashion, i.e., in the order that the input is fed to the algorithm, without having the entire input available from the start. In contrast, an offline algorithm is given the whole problem data from the beginning and is required to output an answer which solves the problem at hand. [Wiki])

Answer: Online

Q11: Give reasons for the choice made in Q9. Explain in 2-3 sentences.

Answer: Do not understand it sufficiently.

Q12: What "understandability rating" would you give yourself for comprehending the algorithm, on a scale of 10? (Note: with 10 being expert understandability).

Answer: 1

Q13: Explain, what was it that you did not understand in the given algorithm? Please answer in a sentence.

Answer: Too many things for one sentence - was lost in the 3rd statement.

Q14: What does the procedure "update" do? (Single sentence recommended)

Answer: Updates an existing tree to create new transitions and links

Q15: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: Makes transitions that split the tree based on test values.

Q16: What does the procedure "canonize" do? (Single sentence recommended)

Answer: Creates the first transition.

Q17: Your Name

Answer: Anish Giri

Respondent 19:

Q1: What does the algorithm aim to achieve? Explain in a single sentence.

Answer: Update the functionality of system based on its transition states

Q2: What was the hint you picked up from the algorithm that makes you comprehend the motto of the algorithm? Explain exactly in detail in at least 3 sentences.

Answer: The 2nd module indicates some kind of a check on the parameters. Based on this the Transition states are updated. Also the module canonize has a sanity check on the parameters before returning true or false

Q3: What does entity, in algorithm1 represent?

Answer: simply an array and does not signify anything in specific

Q4: Give reasons for the choice you made in Q3. Explain in 2-3 sentences.

Answer: I don't find the data to be in any of the standard entity type as they don't seem to possess any standard features like the ones stacks or lists possess. Also, an array is used to just point at the entities defined in the algorithm

Q5: What is the algorithmic complexity in the best case for this algorithm?

Answer: O (n2)

Q6: What is the algorithmic complexity in the worst case for this algorithm?

Answer: O (n2)

Q7: Imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: Game

Q8: Give 3 design features that you would incorporate for the product you are building in Q7.

Answer: Mind craft puzzle, multiplayer environment

Q9: What makes you think that you are developing the right software product with the given algorithm? Answer Q9 based on the answer given in Q7.

Answer: The state transition helps based on certain calculations made from the functions like f' or g' as such

Q10: What kind of an algorithm, is the given algorithm? (Note: In computer science, an online algorithm is one that can process its input piece-by-piece in a serial fashion, i.e., in the order that the input is fed to the algorithm, without having the entire input available from the start. In contrast, an offline algorithm is given the whole problem data from the beginning and is required to output an answer which solves the problem at hand. [Wiki])

Answer: Offline

Q11: Give reasons for the choice made in Q9. Explain in 2-3 sentences.

Answer: The state transitions based on the input

Q12: What "understandability rating" would you give yourself for comprehending the algorithm, on a scale of 10? (Note: with 10 being expert understandability).

Answer: 2

Q13: Explain, what was it that you did not understand in the given algorithm? Please answer in a sentence.

Answer: The exact functionality of the modules

Q14: What does the procedure "update" do? (Single sentence recommended)

Answer: Updates the system based on few parameters and constraints

Q15: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: Changes the state of the system components keeping few checks into consideration

Q16: What does the procedure "canonize" do? (Single sentence recommended)

Answer: Sanity check on the parameters and return the state

Q17: Your Name

Answer: Suhas

Respondent 20:

Q1: What does the algorithm aim to achieve? Explain in a single sentence.

Answer: I don't know.

Q2: What was the hint you picked up from the algorithm that makes you comprehend the motto of the algorithm? Explain exactly in detail in at least 3 sentences.

Answer: I didn't find any hints. I'd be guessing if I said I found any.

Q3: What does entity, in algorithm1 represent?

Answer: None

Q4: Give reasons for the choice you made in Q3. Explain in 2-3 sentences.

Answer: This occurs twice, "create new entity link f'(oldr) =" first setting it equal to r and then s. I don't know what it represents s though.

Q5: What is the algorithmic complexity in the best case for this algorithm?

Answer: O (n)

Q6: What is the algorithmic complexity in the worst case for this algorithm?

Answer: O (n3)

Q7: Imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: Nothing, because I don't understand it.

Q8: Give 3 design features that you would incorporate for the product you are building in Q7.

Answer: NA

Q9: What makes you think that you are developing the right software product with the given algorithm? Answer Q9 based on the answer given in Q7.

Answer: NA - I'd need to understand it first.

Q10: What kind of an algorithm, is the given algorithm? (Note: In computer science, an online algorithm is one that can process its input piece-by-piece in a serial fashion, i.e., in the order that the input is fed to the algorithm, without having the entire input available from the start. In contrast, an offline algorithm is given the whole problem data from the beginning and is required to output an answer which solves the problem at hand. [Wiki])

Answer: Offline

Q11: Give reasons for the choice made in Q9. Explain in 2-3 sentences.

Answer: No choices, no reasons.

Q12: What "understandability rating" would you give yourself for comprehending the algorithm, on a scale of 10? (Note: with 10 being expert understandability).

Answer: 1

Q13: Explain, what was it that you did not understand in the given algorithm? Please answer in a sentence.

Answer: I don't understand the syntax of the language.

Q14: What does the procedure "update" do? (Single sentence recommended)

Answer: Don't know

Q15: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: Don't know

Q16: What does the procedure "canonize" do? (Single sentence recommended)

Answer: Don't know

Q17: Your Name

Answer: John Abbott

Respondent 21:

Q1: What does the algorithm aim to achieve? Explain in a single sentence.

Answer: Update the existing data structure with a particular value and for a particular duration of time or time intervals.

Q2: What was the hint you picked up from the algorithm that makes you comprehend the motto of the algorithm? Explain exactly in detail in at least 3 sentences.

Answer: Lot of emphasis on time. Same functions called repeatedly to check validity.

Q3: What does entity, in algorithm1 represent?

Answer: Linked List

Q4: Give reasons for the choice you made in Q3. Explain in 2-3 sentences.

Answer: The order definitely matters. As it has something to do with time.

Q5: What is the algorithmic complexity in the best case for this algorithm?

Answer: O (n)

Q6: What is the algorithmic complexity in the worst case for this algorithm?

Answer: O (n2)

Q7: Imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: Respondent skipped this question

Q8: Give 3 design features that you would incorporate for the product you are building in Q7.

Answer: Respondent skipped this question

Q9: What makes you think that you are developing the right software product with the given algorithm? Answer Q9 based on the answer given in Q7.

Answer: Respondent skipped this question

Q10: What kind of an algorithm, is the given algorithm? (Note: In computer science, an online algorithm is one that can process its input piece-by-piece in a serial fashion, i.e., in the order that the input is fed to the algorithm, without having the entire input available from the start. In contrast, an offline algorithm is given the whole problem data from the beginning and is required to output an answer which solves the problem at hand. [Wiki])

Answer: Online

Q11: Give reasons for the choice made in Q9. Explain in 2-3 sentences.

Answer: There are checks to see if p

Q12: What "understandability rating" would you give yourself for comprehending the algorithm, on a scale of 10? (Note: with 10 being expert understandability).

Answer: 4

Q13: Explain, what was it that you did not understand in the given algorithm? Please answer in a sentence.

Answer: What ti was, it was passed to different procedures and what finding transition meant.

Q14: What does the procedure "update" do? (Single sentence recommended)

Answer: Updates the value from time k to i

Q15: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: Checks validity of the data structure

Q16: What does the procedure "canonize" do? (Single sentence recommended)

Answer: Checks if the particular combination works.

Q17: Your Name

Answer: Akshay

Respondent 22:

Q1: What does the algorithm aim to achieve? Explain in a single sentence.

Answer: The algorithm aims to "update" the input variables "s, k" by iterating over the end-point and invoking the "canonize" and "test-and-split" procedures.

Q2: What was the hint you picked up from the algorithm that makes you comprehend the motto of the algorithm? Explain exactly in detail in at least 3 sentences.

Answer: - the procedure names, viz. "update", "test-and-split" and "canonize"

- some parts of the algorithm are in english

- indentation

Q3: What does entity, in algorithm1 represent?

Answer: Linked List

Q4: Give reasons for the choice you made in Q3. Explain in 2-3 sentences.

Answer: From the algorithm, I can see that the root must be the root of the linked list and "link" closely resembles the linked list's link

Q5: What is the algorithmic complexity in the best case for this algorithm?

Answer: O (n2)

Q6: What is the algorithmic complexity in the worst case for this algorithm?

Answer: O (n2)

Q7: Imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: I would probably build an application to update the network and transition/canonize it according to the changes in the parameters

Q8: Give 3 design features that you would incorporate for the product you are building in Q7.

Answer: Connections in the network, update of IP Addresses,
Changes in the network configuration

Q9: What makes you think that you are developing the right software product with the given algorithm? Answer Q9 based on the answer given in Q7.

Answer: The keywords in the algorithm and the algorithm itself

Q10: What kind of an algorithm, is the given algorithm? (Note: In computer science, an online algorithm is one that can process its input piece-by-piece in a serial fashion, i.e., in the order that the input is fed to the algorithm, without having the entire input available from the start. In contrast, an offline algorithm is given the whole problem data from the beginning and is required to output an answer which solves the problem at hand. [Wiki])

Answer: Online

Q11: Give reasons for the choice made in Q9. Explain in 2-3 sentences.

Answer: The Iteration i, the while loop and the transition functions suggest to me that this must be online algorithm

Q12: What "understandability rating" would you give yourself for comprehending the algorithm, on a scale of 10? (Note: with 10 being expert understandability).

Answer: 5

Q13: Explain, what was it that you did not understand in the given algorithm? Please answer in a sentence.

Answer: I did not understand what transition does, the variable names without the explanation of what they signify made it harder for me to understand the algorithm

Q14: What does the procedure "update" do? (Single sentence recommended)

Answer: Update the variable s, k for each iteration of i

Q15: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: Given the input variables, it tests whether the result is true/false and s/r

Q16: What does the procedure "canonize" do? (Single sentence recommended)

Answer: Given the input variables s, k, p, it "transitions" the variables, based on a condition and returns s, k

Q17: Your Name

Answer: Neeraj Bahl

Respondent 23:

Q1: What does the algorithm aim to achieve? Explain in a single sentence.

Answer: This algorithm tries to form some sort of list data structure with the given input nodes. The nodes of the tree are added in each stage based on some test condition.

Q2: What was the hint you picked up from the algorithm that makes you comprehend the motto of the algorithm? Explain exactly in detail in at least 3 sentences.

Answer: 1) The nodes of the list are added according to some rule based on test and split function which is indicated by if -else

Loop 2) I assume that canonize function is something like a normalization that returns the next state based on some condition

3)

Q3: What does entity, in algorithm1 represent?

Answer: Linked List

Q4: Give reasons for the choice you made in Q3. Explain in 2-3 sentences.

Answer: 1) It cannot be a tree since (at least) a binary tree must have a left and right sub tree for which I don't think the elements

are added

2) Also, I feel that it cannot be a stack since elements are not removed in LIFO manner

3) Option 3 and 4 does not make some relevance to the given algorithm

Hence I feel it has to be something to do with list

Q5: What is the algorithmic complexity in the best case for this algorithm?

Answer: O (n)

Q6: What is the algorithmic complexity in the worst case for this algorithm?

Answer: O (n2)

Q7: Imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: May be we can define some sort of finite automate with

this.

Q8: Give 3 design features that you would incorporate for the product you are building in Q7.

Answer: A state machine

Q9: What makes you think that you are developing the right software product with the given algorithm? Answer Q9 based on the answer given in Q7.

Answer: The idea of link list can be used in finite automata.

Q10: What kind of an algorithm, is the given algorithm? (Note: In computer science, an online algorithm is one that can process its input piece-by-piece in a serial fashion, i.e., in the order that the input is fed to the algorithm, without having the entire input available from the start. In contrast, an offline algorithm is given the whole problem data from the beginning and is required to output an answer which solves the problem at hand. [Wiki])

Answer: Online

Q11: Give reasons for the choice made in Q9. Explain in 2-3 sentences.

Answer: Since DFA works based on concept of list, I thought we can apply this algorithm can be used to define a DFA

Q12: What "understandability rating" would you give yourself for comprehending the algorithm, on a scale of 10? (Note: with 10 being expert understandability).

Answer: 3

Q13: Explain, what was it that you did not understand in the given algorithm? Please answer in a sentence.

Answer: I didn’t understand the working of test- and split. I only got a superficial understanding of the algorithm. And the while part of canonize is also kind of ambiguous for me.

Q14: What does the procedure "update" do? (Single sentence recommended)

Answer: It updates the state information based on some criteria

Q15: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: It tests the given state value. If there is some transition from state S to some other state, it returns true else false

Q16: What does the procedure “canonize" do? (Single sentence recommended)

Answer: Some sort of normalization function

Q17: Your Name

Answer: Hamsalekha Venkatesh

Respondent 24:

Q1: What does the algorithm aim to achieve? Explain in a single sentence.

Answer: No context given, it is using some previous value to test against the current value and create a new transition but I have no clarity about what it wants to achieve.

Q2: What was the hint you picked up from the algorithm that makes you comprehend the motto of the algorithm? Explain exactly in detail in at least 3 sentences.

Answer: It is trying to create a collection based on the existing data and create new links as an when suitable.

Q3: What does entity, in algorithm1 represent?

Answer: Linked List

Q4: Give reasons for the choice you made in Q3. Explain in 2-3 sentences.

Answer: Look like some transition are made but not sure why.

Q5: What is the algorithmic complexity in the best case for this algorithm?

Answer: O (n)

Q6: What is the algorithmic complexity in the worst case for this algorithm?

Answer: O (n3)

Q7: Imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: No idea

Q8: Give 3 design features that you would incorporate for the product you are building in Q7.

Answer: No idea

Q9: What makes you think that you are developing the right software product with the given algorithm? Answer Q9 based on the answer given in Q7.

Answer: No idea.

Q10: What kind of an algorithm, is the given algorithm? (Note: In computer science, an online algorithm is one that can process its input piece-by-piece in a serial fashion, i.e., in the order that the input is fed to the algorithm, without having the entire input available from the start. In contrast, an offline algorithm is given the whole problem data from the beginning and is required to output an answer which solves the problem at hand. [Wiki])

Answer: Online

Q11: Give reasons for the choice made in Q9. Explain in 2-3 sentences.

Answer: it is working in place changing the transitions at any given i^{th} value.

Q12: What "understandability rating" would you give yourself for comprehending the algorithm, on a scale of 10? (Note: with 10 being expert understandability).

Answer: 1

Q13: Explain, what was it that you did not understand in the given algorithm? Please answer in a sentence.

Answer: No context. To many new declarations and their reuse without the context is difficult to understand.

Q14: What does the procedure "update" do? (Single sentence recommended)

Answer: update the collection based on new input.

Q15: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: Checks for the current transition and if required split it.

Q16: What does the procedure "canonize" do? (Single sentence recommended)

Answer: reorder all the entites based on the current result.

Q17: Your Name

Answer: Kedar Pitke

Respondent 25:

Q1: What does the algorithm aim to achieve? Explain in a single sentence.

Answer: Algorithm aims to test and update links and transitions

Q2: What was the hint you picked up from the algorithm that makes you comprehend the motto of the algorithm?

Explain exactly in detail in at least 3 sentences.

Answer: Respondent skipped this question

Q3: What does entity, in algorithm1 represent?

Answer: Linked List

Q4: Give reasons for the choice you made in Q3. Explain in 2-3 sentences.

Answer: Respondent skipped this question

Q5: What is the algorithmic complexity in the best case for this algorithm?

Answer: O (n)

Q6: What is the algorithmic complexity in the worst case for this algorithm?

Answer: O (n4)

Q7: Imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: Respondent skipped this question

Q8: Give 3 design features that you would incorporate for the product you are building in Q7.

Answer: Respondent skipped this question

Q9: What makes you think that you are developing the right software product with the given algorithm? Answer Q9 based on the answer given in Q7.

Answer: Respondent skipped this question

Q10: What kind of an algorithm, is the given algorithm? (Note: In computer science, an online algorithm is one that can process its input piece-by-piece in a serial fashion, i.e., in the order that the input is fed to the algorithm, without having the entire input available from the start. In contrast, an offline algorithm is given the whole problem data from the beginning and is required to output an answer which solves the problem at hand. [Wiki])

Answer: Respondent skipped this question

Q11: Give reasons for the choice made in Q9. Explain in 2-3 sentences.

Answer: Respondent skipped this question

Q12: What "understandability rating" would you give yourself for comprehending the algorithm, on a scale of 10? (Note: with 10 being expert understandability).

Answer: 2

Q13: Explain, what was it that you did not understand in the given algorithm? Please answer in a sentence.

Answer: The procedure was difficult to figure out

Q14: What does the procedure "update" do? (Single sentence recommended)

Answer: updates the link

Q15: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: updates and split the link

Q16: What does the procedure "canonize" do? (Single sentence recommended)

Answer: assigns new value to root

Q17: Your Name

Answer: Syed Zafar Shah

Respondent 26:

Q1: What does the algorithm aim to achieve? Explain in a single sentence.

Answer: It's about reaching the root of the tree by checking for transitions among consecutive elements

Q2: What was the hint you picked up from the algorithm that makes you comprehend the motto of the algorithm? Explain exactly in detail in at least 3 sentences.

Answer: The search/update is made until root is reached, it talks about checking each element and looking for any transitions for those elements.

Q3: What does entity, in algorithm1 represent?

Answer: Suffix/Suffix tree

Q4: Give reasons for the choice you made in Q3. Explain in 2-3 sentences.

Answer: Because the algo talks about transition from one element to another. And successive elements (i, [i-1]) are considered in the algo

Q5: What is the algorithmic complexity in the best case for this algorithm?

Answer: O (n)

Q6: What is the algorithmic complexity in the worst case for this algorithm?

Answer: O (n2)

Q7: Imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: find friends of friends in a social network based on the tree structure.

Q8: Give 3 design features that you would incorporate for the product you are building in Q7.

Answer: Respondent skipped this question

Q9: What makes you think that you are developing the right software product with the given algorithm? Answer Q9 based on the answer given in Q7.

Answer: Respondent skipped this question

Q10: What kind of an algorithm, is the given algorithm? (Note: In computer science, an online algorithm is one that can process its input piece-by-piece in a serial fashion, i.e., in the order that the input is fed to the algorithm, without having the entire input available from the start. In contrast, an offline algorithm is given the whole problem data from the beginning and is required to output an answer which solves the problem at hand. [Wiki])

Answer: Offline

Q11: Give reasons for the choice made in Q9. Explain in 2-3 sentences.

Answer: The whole tree or set of data has to be given before the search starts.

Q12: What "understandability rating" would you give yourself for comprehending the algorithm, on a scale of 10? (Note: with 10 being expert understandability).

Answer: 4

Q13: Explain, what was it that you did not understand in the given algorithm? Please answer in a sentence.

Answer: just alphabets of the variables dint help to understand what they are actually meant for.

Q14: What does the procedure "update" do? (Single sentence recommended)

Answer: checks for any existing transition, updates the transition and if not root, creates a new entity for each transition found.

Q15: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: checks for any transition existing. If so, returns true. else false

Q16: What does the procedure “canonize" do? (Single sentence recommended)

Answer: I did not understand this function properly. it updates the transition in some sort.

Q17: Your Name

Answer: Respondent skipped this question.

Respondent 27:

Q1: What does the algorithm aim to achieve? Explain in a single sentence.

Answer: The algorithm aims to assess each state and the transition from one state to another in a graph-like data structure.

Q2: What was the hint you picked up from the algorithm that makes you comprehend the motto of the algorithm? Explain exactly in detail in at least 3 sentences.

Answer: The key hints conveyed by the algorithm that made me comprehend it as i did, would be setting links from one node to another, checking if root node or end node is encountered or not.

Q3: What does entity, in algorithm1 represent?

Answer: Linked List

Q4: Give reasons for the choice you made in Q3. Explain in 2-3 sentences.

Answer: Probably because it has different node-like entities and there is transition involved from one state to another. It is similar to traversing a graph.

Q5: What is the algorithmic complexity in the best case for this algorithm?

Answer: O (n)

Q6: What is the algorithmic complexity in the worst case for this algorithm?

Answer: O (n2)

Q7: Imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: Banking application

Q8: Give 3 design features that you would incorporate for the product you are building in Q7.

Answer: security, reliability, quality

Q9: What makes you think that you are developing the right software product with the given algorithm? Answer Q9 based on the answer given in Q7.

Answer: not sure. Maybe because of linked states

Q10: What kind of an algorithm, is the given algorithm? (Note: In computer science, an online algorithm is one that can process its input piece-by-piece in a serial fashion, i.e., in the order that the input is fed to the algorithm, without having the entire input available from the start. In contrast, an offline algorithm is given the whole problem data from the beginning and is required to output an answer which solves the problem at hand. [Wiki])

Answer: Online

Q11: Give reasons for the choice made in Q9. Explain in 2-3 sentences.

Answer: Respondent skipped this question

Q12: What "understandability rating" would you give yourself for comprehending the algorithm, on a scale of 10? (Note: with 10 being expert understandability).

Answer: 4

Q13: Explain, what was it that you did not understand in the given algorithm? Please answer in a sentence.

Answer: The canonize procedure in particular

Q14: What does the procedure "update" do? (Single sentence recommended)

Answer: updates the transition of states/sets new links

Q15: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: tests each state/entity and sets inks to new state from a given state based on some conditions

Q16: What does the procedure "canonize" do? (Single sentence recommended)

Answer: finds transitions (not sure)

Q17: Your Name

Answer: Japa Swadia

Respondent 28:

Q1: What does the algorithm aim to achieve? Explain in a single sentence.

Answer: Conversion from one linked list to another linked list of a transition state not known.

Q2: What was the hint you picked up from the algorithm that makes you comprehend the motto of the algorithm? Explain exactly in detail in at least 3 sentences.

Answer: t–transition from s

Q3: What does entity, in algorithm1 represent?

Answer: Linked List

Q4: Give reasons for the choice you made in Q3. Explain in 2-3 sentences.

Answer: links are present and conversion from one state to another

Q5: What is the algorithmic complexity in the best case for this algorithm?

Answer: O (n2)

Q6: What is the algorithmic complexity in the worst case for this algorithm?

Answer: O (n2)

Q7: Imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: Given 2 Strings how much nodes we have to change to convert into another string

Q8: Give 3 design features that you would incorporate for the product you are building in Q7.

Answer: provide small chunks of data at a time, parallel programming, OLTP transactions.

Q9: What makes you think that you are developing the right software product with the given algorithm? Answer Q9 based on the answer given in Q7.

Answer: online algorithm

Q10: What kind of an algorithm, is the given algorithm? (Note: In computer science, an online algorithm is one that can process its input piece-by-piece in a serial fashion, i.e., in the order that the input is fed to the algorithm, without having the entire input available from the start. In contrast, an offline algorithm is given the whole problem data from the beginning and is required to output an answer which solves the problem at hand. [Wiki])

Answer: Offline

Q11: Give reasons for the choice made in Q9. Explain in 2-3 sentences.

Answer: It’s processing small data at a time not the full data

Q12: What "understandability rating" would you give yourself for comprehending the algorithm, on a scale of 10? (Note: with 10 being expert understandability).

Answer: 3

Q13: Explain, what was it that you did not understand in the given algorithm? Please answer in a sentence.

Answer: what is transformation like g'

Q14: What does the procedure "update" do? (Single sentence recommended)

Answer: it changes a state (node) from another in the linked list

Q15: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: it splits the old unchanged linked list with new part to be updated

Q16: What does the procedure “canonize" do? (Single sentence recommended)

Answer: it normalizes the data

Q17: Your Name

Answer: Pankaj

APPENDIX B

EXPERIMENT RESULTS (PHASE II)

Respondent 1:

Q1: Again imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: I can create an online market tool which can be used to analyze the various static factors step by step.

Q2: What makes you think that you are developing the right software product with the given algorithm? Answer Q2 based on the answer given in Q1.

Answer: The algorithm is trying to add new suffixes to the prefix. Similarly I can add new factors to the market tool.

Q3: Give 3 design features that you would incorporate for the product you are building in Q1.

Answer: Need to first create the root problem. Make the person list the various factors affecting the root problem. If some factors are sub factors then need to put it under the main factor.

Q4: Now, what does the procedure "update" do? (Single sentence recommended)

Answer: Keep adding new suffixes to the prefix.

Q5: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: Split the main problem into many different sub problems and also check if the sub problems satisfy the condition

Q6: Again, what does the procedure "canonize" do? (Single sentence recommended)

Answer: This is used for special cases. We try to find the starting character.

Q7: Your Name

Answer: Respondent skipped this question

Respondent 2:

Q1: Again imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: manage the cost and resource of a project by picking an optimal way to do so

Q2: What makes you think that you are developing the right software product with the given algorithm? Answer Q2 based on the answer given in Q1.

Answer: It picks the best way to perform a solution

Q3: Give 3 design features that you would incorporate for the product you are building in Q1.

Answer: to be able to pick any number of elements/resources for which you want to evaluate the cost, give multiple options- i.e. not only the best solution but also the next best,

Q4: Now, what does the procedure "update" do? (Single sentence recommended)

Answer: Contract an optimized tree structure

Q5: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: It test the node and splits it into two - as in two ways to be able to get to the parent node.

Q6: Again, what does the procedure "canonize" do? (Single sentence recommended)

Answer: either picks the parent /sibling node if the cost of the current node is greater than the rest.

Q7: Your Name

Answer: *Respondent skipped this question*

Respondent 3

Q1: Again imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: I will create a family tree using some feature in numerical data about the family members and predict and future generations feature pattern.

Q2: What makes you think that you are developing the right software product with the given algorithm? Answer Q2 based on the answer given in Q1.

Answer: It is calculating, splitting and expanding.

Q3: Give 3 design features that you would incorporate for the product you are building in Q1.

Answer: calculate current feature, calculate and predict future members feature.

Q4: Now, what does the procedure "update" do? (Single sentence recommended)

Answer: calculates and updates points.

Q5: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: checks the points and calculates expanded points and returns.

Q6: Again, what does the procedure "canonize" do? (Single sentence recommended)

Answer: somewhat similar to testandsplit but i did not understand.

Q7: Your Name

Answer: Respondent skipped this question

Respondent 4:

Q1: Again imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: voice to text conversion tool

Q2: What makes you think that you are developing the right software product with the given algorithm? Answer Q2 based on the answer given in Q1.

Answer: I can teach my tool to expand its word list by adding new words

Q3: Give 3 design features that you would incorporate for the product you are building in Q1.

Answer: offline access, learning capability,

Q4: Now, what does the procedure "update" do? (Single sentence recommended)

Answer: keeps adding a new word at the end of a previous word.

Q5: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: tests if a sentence/ word can be split into smaller parts and checks if it satisfies the condition.

Q6: Again, what does the procedure "canonize" do? (Single sentence recommended)

Answer: Maybe to find the starting alphabet/word in a sentence.

Q7: Your Name

Answer: Respondent skipped this question

Respondent 5:

Q1: Again imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: To parse valid words.

Q2: What makes you think that you are developing the right software product with the given algorithm? Answer Q2 based on the answer given in Q1.

Answer: As you descend from the root towards the leaf, you will get valid words.

Q3: Give 3 design features that you would incorporate for the product you are building in Q1.

Answer: Abstraction, Structural partitioning, Control Hierarchy

Q4: Now, what does the procedure "update" do? (Single sentence recommended)

Answer: Updates the suffix tree.

Q5: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: Makes transition from one branch of the tree to the other.

Q6: Again, what does the procedure "canonize" do? (Single sentence recommended)

Answer: Makes the transition to find the correct value of s.

Q7: Your Name

Answer: Sameer Srinivas

Respondent 6:

Q1: Again imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: database system

Q2: What makes you think that you are developing the right software product with the given algorithm? Answer Q2 based on the answer given in Q1.

Answer: the efficiency of STree in data storage

Q3: Give 3 design features that you would incorporate for the product you are building in Q1.

Answer: data consistency, data integrity, efficiency

Q4: Now, what does the procedure "update" do? (Single sentence recommended)

Answer: form the data into a STree

Q5: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: reduce the dirty data part

Q6: Again, what does the procedure "canonize" do? (Single sentence recommended)

Answer: form the tree part

Q7: Your Name

Answer: Wenbo Tian

Respondent 7:

Q1: Again imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: I would create a route finding system using this algorithm.

Q2: What makes you think that you are developing the right software product with the given algorithm? Answer Q2 based on the answer given in Q1.

Answer: I think the suffix tree algorithm can be used to build this system because it offers different paths from root to go to the desired node.

Q3: Give 3 design features that you would incorporate for the product you are building in Q1.

Answer: Shortest route, alternative route and searching a particular

Q4: Now, what does the procedure "update" do? (Single sentence recommended)

Answer: Creates a node if not present, if present updates it to a new value.

Q5: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: After the input is taken, in this case cacao, it starts updating the transitions.

Q6: Again, what does the procedure "canonize" do? (Single sentence recommended)

Answer: Canonize returns the correct selection of values to be used by test and split

Q7: Your Name

Answer: Mandar Patwardhan

Respondent 8:

Q1: Again imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: Something similar to LinkedIn

Q2: What makes you think that you are developing the right software product with the given algorithm? Answer Q2 based on the answer given in Q1.

Answer: Because of suffix tree, links are going to/from nodes

Q3: Give 3 design features that you would incorporate for the product you are building in Q1.

Answer: Respondent skipped this question

Q4: Now, what does the procedure "update" do? (Single sentence recommended)

Answer: construction of suffix tree algorithm

Q5: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: Respondent skipped this question

Q6: Again, what does the procedure "canonize" do? (Single sentence recommended)

Answer: Respondent skipped this question

Q7: Your Name

Answer: Chinmay

Respondent 9:

Q1: Again imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: Probably, for string matching algorithms. Or to find if a string is substring of another. So the product can be something like a DNA matching. Something which requires us to work with huge length strings.

Q2: What makes you think that you are developing the right software product with the given algorithm? Answer Q2 based on the answer given in Q1.

Answer: As it provides ease for string and substring matching, working with huge length strings will be ease as well as efficient considering the time complexity of the algorithm.

Q3: Give 3 design features that you would incorporate for the product you are building in Q1.

Answer: Respondent skipped this question

Q4: Now, what does the procedure "update" do? (Single sentence recommended)

Answer: The entire algorithm focuses on construction of suffix trees. Update will create a new transition

Q5: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: It splits in prefix and suffix nodes

Q6: Again, what does the procedure "canonize" do? (Single sentence recommended)

Answer: No idea

Q7: Your Name

Answer: Avani Chandurkar

Respondent 10:

Q1: Again imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: Scheduling tool.

Q2: What makes you think that you are developing the right software product with the given algorithm? Answer Q2 based on the answer given in Q1.

Answer: In a scheduling tool there are a lot links to elements like a day or time. Considering what actions are to be performed on a day or time, this algorithm would be a good fit.

Q3: Give 3 design features that you would incorporate for the product you are building in Q1.

Answer: Login-Logout feature based on which we can track if employee will be able to maintain schedule, time manager for notifications, calender

Q4: Now, what does the procedure "update" do? (Single sentence recommended)

Answer: Update the tree, will add if no element, will canonize if root, will test-and-split if end-point.

Q5: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: returns true or false based on the current element being traversed.

Q6: Again, what does the procedure "canonize" do? (Single sentence recommended)

Answer: It will find and return the transition if k>p

Q7: Your Name

Answer: Salil Batra

Respondent 11:

Q1: Again imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: Recommendation System.

Q2: What makes you think that you are developing the right software product with the given algorithm? Answer Q2 based on the answer given in Q1.

Answer: The value of the transition of the nodes depends on the neighboring transitions which will help the recommendation system work.

Q3: Give 3 design features that you would incorporate for the product you are building in Q1.

Answer: Understandability, reusability, accuracy

Q4: Now, what does the procedure "update" do? (Single sentence recommended)

Answer: Updates the value of the transition edges.

Q5: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: It tests whether the node is the leaf node or not and then splits it up.

Q6: Again, what does the procedure "canonize" do? (Single sentence recommended)

Answer: Normalizes the value of the nodes based on the parent node.

Q7: Your Name

Answer: Abir Saha

Respondent 12:

Q1: Again imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: I would use it for Natural language processing algorithms.

Q2: What makes you think that you are developing the right software product with the given algorithm? Answer Q2 based on the answer given in Q1.

Answer: It would be a right fit to synthesize words from individual letters.

Q3: Give 3 design features that you would incorporate for the product you are building in Q1.

Answer: 1. Reliability. 2. Stability 3. Effectiveness

Q4: Now, what does the procedure "update" do? (Single sentence recommended)

Answer: Adds new letters to the existing branch to make new words.

Q5: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: Tests if a word can be split into multiple letters and split.

Q6: Again, what does the procedure "canonize" do? (Single sentence recommended)

Answer: Find starting letter

Q7: Your Name

Answer: Vignesh Kannan

Respondent 13:

Q1: Again imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: Constructing a "DnA pattern" or a musical note string.

Q2: What makes you think that you are developing the right software product with the given algorithm? Answer Q2 based on the answer given in Q1.

Answer: Given the algorithm is used to construct a series of pattern, the product being developed is correct

Q3: Give 3 design features that you would incorporate for the product you are building in Q1.

Answer: Search for a pattern or update the pattern with a given input

Q4: Now, what does the procedure "update" do? (Single sentence recommended)

Answer: Update the given data structure with given input

Q5: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: tests and splits the given data structure into root and end-point

Q6: Again, what does the procedure "canonize" do? (Single sentence recommended)

Answer: Finds the connection between root and end point obtained from test and split procedure

Q7: Your Name

Answer: Marutaro

Respondent 14:

Q1: Again imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: Develop a tool that keeps track of ongoing projects.

Q2: What makes you think that you are developing the right software product with the given algorithm? Answer Q2 based on the answer given in Q1.

Answer: The tree holds updated information in the root and provides details of branches too.

Q3: Give 3 design features that you would incorporate for the product you are building in Q1.

Answer: 1. Information held at root. 2. Branching based on conditions like, department or resources required. 3. The cost of splitting could be the time/effort required to keep track of the division of project by department/resources.

Q4: Now, what does the procedure "update" do? (Single sentence recommended)

Answer: Updates information at the root node.

Q5: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: Test a condition and split the node further based on that.

Q6: Again, what does the procedure "canonize" do? (Single sentence recommended)

Answer: Canonize calculates the cost of splitting the node.

Q7: Your Name

Answer: Aveesha Sharma

Respondent 15:

Q1: Again imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: Respondent skipped this question

Q2: What makes you think that you are developing the right software product with the given algorithm? Answer Q2 based on the answer given in Q1.

Answer: Respondent skipped this question

Q3: Give 3 design features that you would incorporate for the product you are building in Q1.

Answer: Respondent skipped this question

Q4: Now, what does the procedure "update" do? (Single sentence recommended)

Answer: checks on the basis of output of test and split, if end is not reached then creates new entity, gives it to canonize and test and split until end is reached and then finally ends with the creation of new entity if the parent is not root

Q5: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: checks if k

Q6: Again, what does the procedure "canonize" do? (Single sentence recommended)

Answer: checks if p

Q7: Your Name

Answer: Meenal Kulkarni

Respondent 16:

Q1: Again imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: pattern matching

Q2: What makes you think that you are developing the right software product with the given algorithm? Answer Q2 based on the answer given in Q1.

Answer: it as something like a finite state machine transition representation ideal to use for pattern matching

Q3: Give 3 design features that you would incorporate for the product you are building in Q1.

Answer: pattern recognition, different possible pattern generation, pattern evaluation

Q4: Now, what does the procedure "update" do? (Single sentence recommended)

Answer: add's new transitions in the suffix tree along with its construction

Q5: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: it examines all the possible transitions to the node and splits the tree further if required

Q6: Again, what does the procedure "canonize" do? (Single sentence recommended)

Answer: it gives possible transitions to a node

Q7: Your Name

Answer: Nitin Goel

Respondent 17:

Q1: Again imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: Update and categorize the words in a dictionary

Q2: What makes you think that you are developing the right software product with the given algorithm? Answer Q2 based on the answer given in Q1.

Answer: Because this is what I think the algorithm is designed to do.

Q3: Give 3 design features that you would incorporate for the product you are building in Q1.

Answer: Sort, update and categorize based on the characters of each word..

Q4: Now, what does the procedure "update" do? (Single sentence recommended)

Answer: By giving it a string "cacao", it updates the tree according to the position of each character

Q5: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: It tests each character and splits the tree if k is not <= p

Q6: Again, what does the procedure "canonize" do? (Single sentence recommended)

Answer: Not sure

Q7: Your Name

Answer: Zahra

Respondent 18:

Q1: Again imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: Predictive text keyboard/ word generator.

Q2: What makes you think that you are developing the right software product with the given algorithm? Answer Q2 based on the answer given in Q1.

Answer: The diagram indicates that the algorithm generates different combinations of the text that is entered, and creates transitions linking each word to another to create a huge possible list of words.

Q3: Give 3 design features that you would incorporate for the product you are building in Q1.

Answer: Anagrams, substrings, basically anything to do with properties of words as strings.

Q4: Now, what does the procedure "update" do? (Single sentence recommended)

Answer: Updates the word

Q5: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: Splits the word and then looks for transitions to create the alternate words

Q6: Again, what does the procedure "canonize" do? (Single sentence recommended)

Answer: Creates the transitions that form the basis for test-andsplit

Q7: Your Name

Answer: Anish Giri

Respondent 19:

Q1: Again imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: game

Q2: What makes you think that you are developing the right software product with the given algorithm? Answer Q2 based on the answer given in Q1.

Answer: the complex transitions of states can be involved in a game development

Q3: Give 3 design features that you would incorporate for the product you are building in Q1.

Answer: multiplayer, dynamic environment

Q4: Now, what does the procedure "update" do? (Single sentence recommended)

Answer: updates the tree with new entities

Q5: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: based on a transition split the tree

Q6: Again, what does the procedure "canonize" do? (Single sentence recommended)

Answer: sanity check on the s transition and find the tk transition

Q7: Your Name

Answer: suhas

Respondent 20:

Q1: Again imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: I still don't understand it.

Q2: What makes you think that you are developing the right software product with the given algorithm? Answer Q2 based on the answer given in Q1**.**

Answer: I don't know.

Q3: Give 3 design features that you would incorporate for the product you are building in Q1.

Answer: NA

Q4: Now, what does the procedure "update" do? (Single sentence recommended)

Answer: I don't know

Q5: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: I don't know

Q6: Again, what does the procedure "canonize" do? (Single sentence recommended)

Answer: I don't know.

Q7: Your Name

Answer: John Abbott

Respondent 21:

Q1: Again imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: I would use this to predict smileys in a text message in an instant messaging application.

Q2: What makes you think that you are developing the right software product with the given algorithm? Answer Q2 based on the answer given in Q1.

Answer: Many smileys begin with the same root. But change based on the unicode characters that appear after that. So In a series of unicode 3 characters, a smiley may be formed from 2 or 3 characters. So it is not right to choose the smiley from the 1st 2 characters.

Q3: Give 3 design features that you would incorporate for the product you are building in Q1.

Answer: 1. Different statuses (Available, busy, Do not disturb, in a meeting), 2. Automatically block offensive words.

Q4: Now, what does the procedure "update" do? (Single sentence recommended)

Answer: Adds a new character

Q5: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: Tests the validity of the current tree.

Q6: Again, what does the procedure "canonize" do? (Single sentence recommended)

Answer: If the tree is not valid, adds the new element by increasing the breadth of the tree.

Q7: Your Name

Answer: Akshay

Respondent 22:

Q1: Again imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: Game Tree Application or Heurestic Search Algorithm

Q2: What makes you think that you are developing the right software product with the given algorithm? Answer Q2 based on the answer given in Q1.

Answer: The structure of the algorithm, feedback mechanism given in each node and the update done accordingly

Q3: Give 3 design features that you would incorporate for the product you are building in Q1.

Answer: Game Agent's actions against an optimal player, Player 1, and the options that the player has

Q4: Now, what does the procedure "update" do? (Single sentence recommended)

Answer: "update" updates the link names, for e.g from "ca" to "cac"

Q5: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: "test-and-split" test the nodes and splits into different parts based on number of links and names of links

Q6: Again, what does the procedure "canonize" do? (Single sentence recommended)

Answer: "canonize" finds the names of the links based on a condition and by iterating using a while loop

Q7: Your Name

Answer: Neeraj Bahl

Respondent 23:

Q1: Again imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: we can build some sort of search index trees like Tries. For example Google search Index uses this approach uses this where all the key words similar as in starting with the same suffix can be clustered under one branch. This helps in good indexing and easy retrieval

Q2: What makes you think that you are developing the right software product with the given algorithm? Answer Q2 based on the answer given in Q1.

Answer: The idea of building a search index works like this. I this way all worda sharing same suffix like under, understand, under-estimate can be effectively used stored in tree manner. I feel its space efficient too

Q3: Give 3 design features that you would incorporate for the product you are building in Q1.

Answer: maintain a tree data structure. Each node will have a link to its parent as well as to all its children.

Q4: Now, what does the procedure "update" do? (Single sentence recommended)

Answer: updates the tree with new entities

Q5: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: splits the root when a new character or information comes.

Q6: Again, what does the procedure "canonize" do? (Single sentence recommended)

Answer: I think it selects the correct branch to which a new character has to be added into the tree

Q7: Your Name

Answer: Hamsalekha Venkatesh

Respondent 24:

Q1: Again imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: Work distribution in the network

Q2: What makes you think that you are developing the right software product with the given algorithm? Answer Q2 based on the answer given in Q1**.**

Answer: It check for the value at which we subdivide and delegate again.

Q3: Give 3 design features that you would incorporate for the product you are building in Q1.

Answer: no concrete idea.

Q4: Now, what does the procedure "update" do? (Single sentence recommended)

Answer: add the new node to the tree

Q5: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: test whether incoming value affects current tree if not then split.

Q6: Again, what does the procedure "canonize" do? (Single sentence recommended)

Answer: Reorder the links in tree

Q7: Your Name

Answer: kedar pitke

Respondent 25:

Q1: Again imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: I will construct a project team hierarchy

Q2: What makes you think that you are developing the right software product with the given algorithm? Answer Q2 based on the answer given in Q1.

Answer: Using proper values

Q3: Give 3 design features that you would incorporate for the product you are building in Q1.

Answer: Respondent skipped this question

Q4: Now, what does the procedure "update" do? (Single sentence recommended)

Answer: Respondent skipped this question

Q5: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: Respondent skipped this question

Q6: Again, what does the procedure "canonize" do? (Single sentence recommended)

Answer: Respondent skipped this question

Q7: Your Name

Answer: Respondent skipped this question

Respondent 26:

Q1: Again imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: Many possible routes to reach a place. Give an alternative route when there is a bottleneck of traffic.

Q2: What makes you think that you are developing the right software product with the given algorithm? Answer Q2 based on the answer given in Q1.

Answer: This algorithm gives many possible transitions or ways to obtain a result.

Q3: Give 3 design features that you would incorporate for the product you are building in Q1.

Answer: since it’s an online algo, will try to provide the routes dynamically, as new set of roadways are included.

Q4: Now, what does the procedure "update" do? (Single sentence recommended)

Answer: updates to the node when a new transition is possible.

Q5: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: creates a new transition or a splits the branch after a threshold point.

Q6: Again, what does the procedure "canonize" do? (Single sentence recommended)

Answer: creates link between the possible routes to obtain the result.

Q7: Your Name

Answer: Akkshaya Gopalakrishnan

Respondent 27:

Q1: Again imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: Mathematical software

Q2: What makes you think that you are developing the right software product with the given algorithm? Answer Q2 based on the answer given in Q1.

Answer: Faster memory access (probably)

Q3: Give 3 design features that you would incorporate for the product you are building in Q1.

Answer: reliability, quality, speed

Q4: Now, what does the procedure "update" do? (Single sentence recommended)

Answer: updates state transitions

Q5: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: tests a particular node and splits (the suffixes) based on given conditions

Q6: Again, what does the procedure "canonize" do? (Single sentence recommended)

Answer: checks each transition and adds suffixes

Q7: Your Name

Answer: Japa Swadia

Respondent 28:

Q1: Again imagine, that you are a chief software architect in an American MNC. You are given this algorithm at your workplace and are asked to develop something innovative with this. What would you develop using this algorithm?

Answer: transition graph like timeline for a project

Q2: What makes you think that you are developing the right software product with the given algorithm? Answer Q2 based on the answer given in Q1.

Answer: It gives all the possible branches/options available for every decision

Q3: Give 3 design features that you would incorporate for the product you are building in Q1.

Answer: Small chunks of data, parallel processing and commenting on algorithms

Q4: Now, what does the procedure "update" do? (Single sentence recommended)

Answer: updates the current state of a node with new entry

Q5: What does procedure "test–and–split" do? (Single sentence recommended)

Answer: it splits a branch if new entry is not already present in Stree

Q6: Again, what does the procedure "canonize" do? (Single sentence recommended)

Answer: canonize traverse the path and make new links to nodes of Stree

Q7: Your Name

Answer: Pankaj

BIOGRAPHICAL SKETCH

Manasa Priyamvada Mannava, is a software engineering graduate student at Arizona State University. She loves to research and develop totally cool software products. She is a java enthusiast and loves anything and everything about java. When free, she takes time to write java tutorials for the beginners, available to all, hosted via github pages.

She is a **Software Engineer** with comprehensive experience with business requirements analysis, application design, software development and project life cycle management with emerging technologies. She has over 2 years of hands-on experience with product development using Java/J2EE technologies, OO programming and UML. She has been involved in R&D Software product development in the past for developing the first version of the Affirmed Service Automation Platform product. She looks forward for a career in Software Product Development.

To know more about her, please visit the following links:

Web: http://www.manasamannava.com

Email: mmannava@asu.edu

LinkedIn: https://www.linkedin.com/in/manasa-priyamvada-mannava-648a51a8